# K2200 Series

Security Systems

EN | Installation Guide
Readykey Controllers

BOSCH

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# 1.0 Introduction

## 1.1 Manual Organization

This document is divided into nine sections. A summary of each section is detailed in the table below.

**Table 1: K2200 Series Installation Guide Organization**

| Section | Description |
|---|---|
| 1 | Introduction |
| 2 | K2200 Series Controllers |
| 3 | Administration Systems |
| 4 | Six-Wire Bus |
| 5 | Installation Guide |
| 6 | Configuration and Testing |
| 7 | Troubleshooting |
| 8 | Faceplate Administration |
| 9 | Transactions |

## 1.2 Other Literature Referenced

Throughout this manual, references will be made to other documentation. See the following table for a more complete and detailed description of the K2200 Series Controllers, which lists the complete part number for ordering purposes.

**Table 2: Other Literature Referenced**

| Name of Document | Part Number Bosch/ Radionics | Part Number PAC |
|---|---|---|
| Readykey for Windows System Overview | 43484 | 17149 |
| Readykey for Windows System Programming Manual | 44611 | 17244 |
| Readykey K2200 Series Controllers User's Guide | 47491 | 17376 |
| Readykey Central Network Controller Installation Guide | 46512 | 17163 |

## 1.3 Documentation Conventions

These conventions are intended to call out important features, items, notes, cautions, and warnings that the reader should be aware of in reading this document.

### 1.3.1 Type Styles Used in this Manual

To help identify important items in the text, the following type styles are used:

**Table 3: Type Styles Used in Manual**

| | |
|---|---|
| **Bold Text** | Usually indicates selections that you may use while programming your panel. May also indicate an important fact that you should note. |
| ***Bold Italicized Text*** | Denotes notes, cautions and/or warnings. |
| *Italicized Text* | Refers you to a drawing, table, or other section of this document, or to another document. Also used to symbolize names for records that you will create. |
| `Courier Text` | Indicates what may appear on the command center/keypad, or internal printer. |
| [CAPITALIZED TEXT] | Indicates a specific key on the device to be pressed. |
| **On-Screen Buttons** | Indicates a specific button that appears on screen |
| **File → New** | This is used to describe the path in getting to a specific sub-menu or command in a Windows-based application.<br>Example: …select File•New to create a new |

### 1.3.2 Tips, Important Notes, Cautions and Warnings

Throughout this document, helpful tips, important notes, cautions and warnings will be presented for the reader to keep in mind. These appear different from the rest of the text as follows;

Important Notes - should be heeded for successful operation and programming. Also tips and shortcuts may be included here.

Caution - These caution the operator that physical damage to the program and/or equipment may occur.

Warning - These warn of the possibility of physical damage to the operator, program and/or equipment.

## 1.4 Abbreviations Used

The following list of abbreviations are used throughout this manual.

| | |
|---|---|
| **AC** | Access Code |
| **AEM** | Alarm Event Manager |
| **AVR** | Automatic Vehicle Recognition |
| **BAT** | Battery |
| **CH** | Channel |
| **CLK** | Clock |
| **CMD** | Command |
| **CNC** | Central Network Controller |
| **COM** | Common |
| **CTS** | Clear To Send |
| **D/C** | Door Controller |
| **DC** | Door Contact |
| **DL** | Down Load |
| **DOS** | Disk Operating System |
| **DTR** | Delay Transmit/Receive |
| **DR** | Door |
| **EMF** | Electro-Motive Force |
| **FIFO** | First In First Out |
| **GND** | Ground |
| **HBC** | High Breaking Capacity |
| **ID** | Identity |
| **IP** | Input or Internet Protocol |
| **LED** | Light Emitting Diode |
| **LK** | Lock |
| **LRT** | Lock Release Time |
| **MOV** | Metal Oxide Varistor |
| **MS** | Alarm Module Sensors |
| **MS-DOS** | Microsoft Disk Operating System |
| **OVRD** | Override |
| **PAL** | Primary Access Level |
| **PB** | Pass Back |
| **PB-TIM** | Pass Back Timeout |
| **PBC** | Pass Back Controller |
| **PC** | Personnel Computer |
| **PIN** | Personal Identity Number |
| **PINTP** | PIN Reader Time Profile |
| **RDR** | Reader |
| **RTE** | Request To Exit |
| **RTS** | Request To Send |
| **RX** | Receive |
| **SIG** | Signal |
| **TAMP** | Tamper |
| **TP** | Time Profile |
| **TX** | Transmit |
| **VCA** | Valid Code Accepted |

## 1.5 Listings and Approval

### 1.5.1 FCC Notice

This equipment generates and uses radio frequency energy. If not installed and used in accordance with the manufacturer's instructions, it may cause interference to radio and television reception. It has been tested and found to comply with the specifications Subpart F of Part 15 of FCC rules for Field Disturbance Sensors. If this equipment causes interference to radio or television reception - which can be determined by turning the equipment on and off - the installer is encouraged to correct the interference by one or more of the following measures:

1. Reorient the antenna of the radio/television,
2. Connect the AC power cord to a different outlet so the control panel and radio/television are on different branch circuits,
3. Relocate the control panel with respect to the radio/television.

If necessary, the installer should consult an experienced radio/television technician for additional suggestions, or send for the "Interference Handbook" prepared by the Federal Communications Commission. This booklet is available from the

U.S. Government Printing Office,
Washington D.C. 20402,
stock no. 004-000-00450-7.

FCC Registration Number: IDHM32Y6K2000

### 1.5.2 UL Listing

UL 294 - Access Control System Units

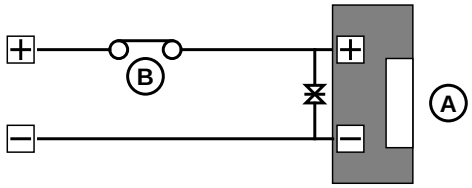
When installing the K2200 series controllers the following should be noted:

### 1.5.3 HEALTH AND SAFETY

It must also comply with any local Fire, Health and Safety regulations. A secured door that may be part of an escape route from an area must be installed with:

- A fail-safe lock (A). So that the door will be released if the power fails. Ideally a magnetic lock should be used as these are less likely to jam or seize.
- A normally-closed break-glass or manual pull (B) in the lock supply wiring. So that in an emergency the fail-safe lock can be immediately powered down.

**Figure 1: Failsafe Lock Wiring**




The controller must be grounded.

Disconnect both ac and battery power supply before working on the controller.

### 1.5.4 CABLING

The cabling used in the Readykey access control systems (six wire bus, reader cables, etc.) are not prone to electrical interference. However, you should avoid routing cable close to heavy load switching cables and equipment. If this is unavoidable, cross the cable at right angles every 3.3 to 6.6 ft (1 to 2 m) to reduce the interference.

# 2.0 K2200 Series Controllers

This section provides a brief introduction to the Readykey K2200 Series Controllers. In it, the user is shown:

- The different controllers in the series and what each does.
- Compatibility with older Readykey products.
- What features are provided on each controller.

Please read this document even if you are familiar with previous Readykey products. There is a great deal of new information contained in this document that should make installation and testing a lot easier. You are also advised to attend a Readykey Training Course before attempting installation

## 2.1 What is the Readykey K2200 Series of Controllers?

### 2.1.1 Introduction

The Readykey K2200 Series Controllers are the successors to the Readykey K2100 Series Controllers. Although all the controllers can operate in standalone mode they are primarily designed to be a part of a larger system administered by Readykey for Windows. This provides easy access to all the new features with configuration carried out mainly at the administration PC.

The controllers will form part of a Readykey Access Control System and it is important that, when installing these controllers, you are aware of the whole system and how it is to be administered.

### 2.1.2 Controllers in the Series

There are two main variants of the Readykey K2200 series. These are described in detail later in this section but briefly they are:

1. Readykey K2200 Multi-Function Door Controller. This is a replacement for the Readykey K2100 with support for four alarm event managers and four doors. It is available with or without a faceplate.
2. Readykey K1200 Multi-Function Door Controller. This is a replacement for the Readykey K1100 with support for two alarm event managers and two doors. It is available with or without a faceplate.

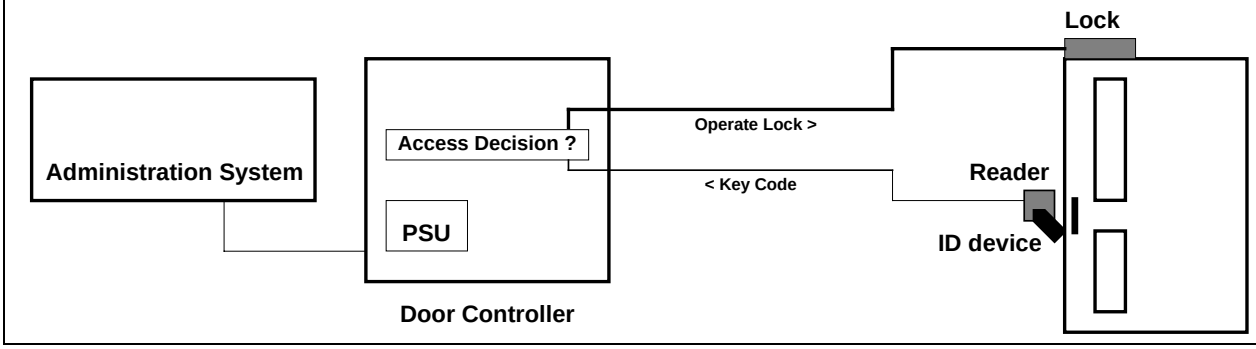
## 2.2 Multi-Function Door Controller

### 2.2.1 Background

Most Readykey access control systems, very simply, consist of eight distinct parts:

1. The ID Device is presented to (or swiped through) the reader to open a door. This has a unique code which identifies it to the system.
2. The Reader, usually fitted close to the door, detects the unique code in the ID device and sends it to the door controller for verification. There are several types of reader available, suitable for different purposes and environments. It is usually situated close to the door.
3. The Request to Exit (RTE) Switch is used to open a door from the secure side (sometimes a reader is used on each side of the door). When the switch is pressed a signal is sent to the controller to release the lock and open the door.
4. The Controller is the heart of the access control system. It compares the unique code in the ID Device with the information stored in its memory and, if the ID Device is valid, it activates the lock to open the door.
5. The PSU(s) powers the controller and locks.
6. The Lock secures the door and is released when a valid ID Device is presented to the reader. Locks can be divided into two main types:
   - Fail Safe - continuously powered with power removed to unlock. If power fails the door will open.
   - Fail Secure - Power supplied to unlock.
7. The Administration System is used to administer the system - program into the system who goes where and when. This may be built into the controller or be on a separate PC.
8. The wiring between the various components (above 1-7).

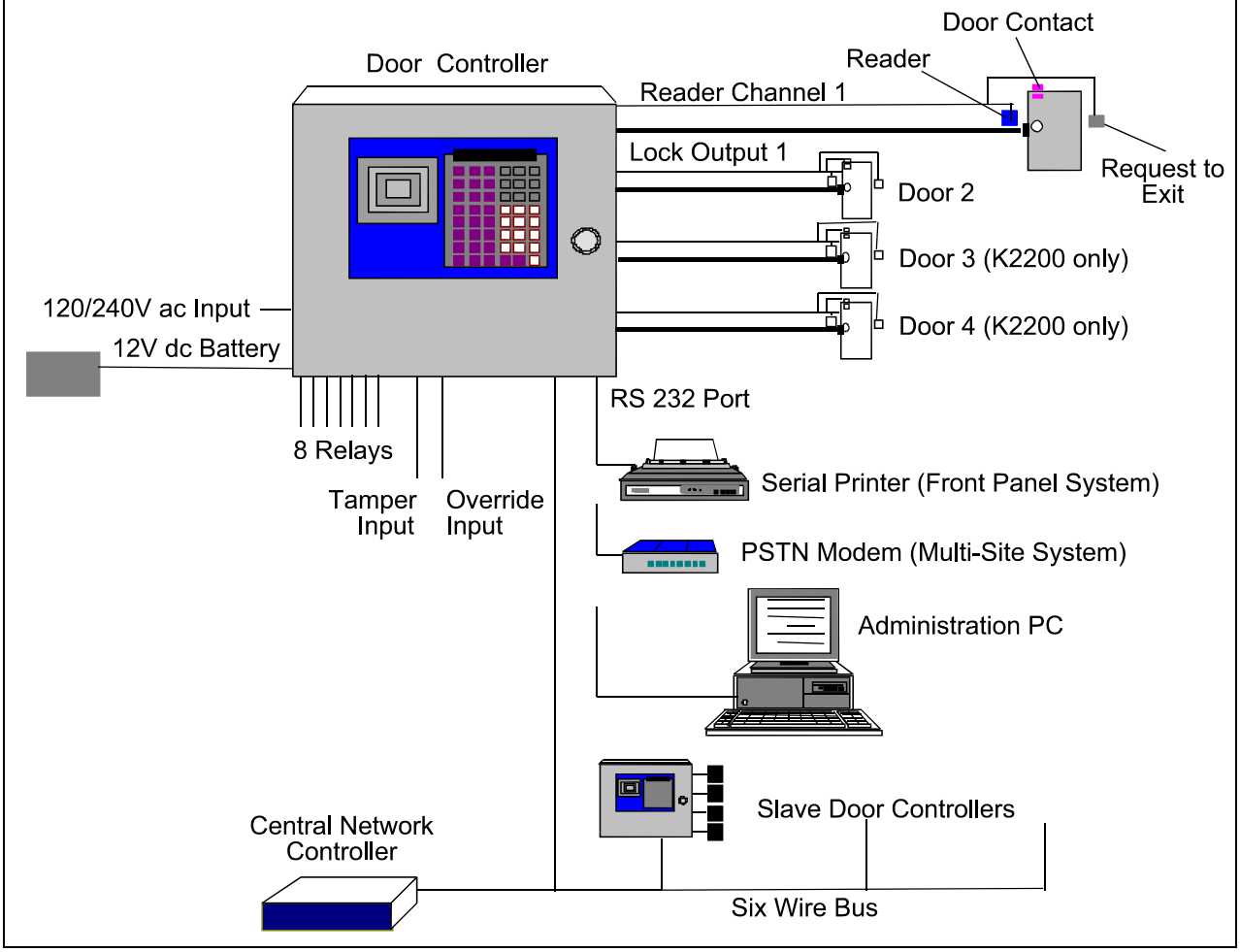
**Figure 2: Components of a Readykey Access Control System**




The Readykey K2200 Series Controllers (K2200 and K1200) are multi-function, i.e. they can be configured to operate in a variety of different modes, depending on the overall system. Some features of the access control system are dependent on the type of administration system used with some features (such as visitors, global anti-passback, transaction searching and reporting) are only available on the PC-based administration systems.

The following diagram shows the typical connections made to the door controller. For full details of how door controllers are connected and administered, see Section 3.0.

**Figure 3: Readykey K2200 System Configuration**



Before installing the door controller, you should be aware of how it is going to be administered. The controller can operate in one of two ways, either as a master or as a slave providing the following administration options:

**Operating as a master, the door controller can be administered:**

- From the door controller's own faceplate, controlling up to 16 doors , 4 on board plus up to 3 slave door controllers.
- From a PC running Readykey for Windows administration software via a PC interface kit. This can control up to 32 doors - 1 master door controller plus up to 7 slave door controllers (Readykey for Windows is supplied with different door license configurations).
- From a PC running Readykey for Windows administration software via a Readykey Central Network Controller (CNC) using a RS-232 serial link, can control up to 32 doors - 8 slave door controllers. This can also accommodate up to 128 (dial-up) remote sites.

**Operating as a slave, the door controller can be administered:**

- From another Readykey K2200 Series Controller configured as a master.
- From a PC running Readykey for Windows administration software via a Readykey Central Network Controller (CNC) or an PC Administration Kit.

### 2.2.2 Components

The door controller itself is made up of 4 individual components:

Secured to the metal base plate are the 110/240 V **power supply** and **main circuit board**. Fitted to the main circuit board is a secondary "cover" board which protects the main board and has a label which identifies the various connectors on the main board. Attached to this is the **memory module** containing the software and database memory. Across the whole unit is a removable **faceplate** with built-in key reader, keypad and display.

All connections are made to the door controller using **removable terminal blocks**.

***Note:***

*All controllers are available without a faceplate. However, at least one faceplate is required to configure the controllers in the system.*

### 2.2.3 Readers

A reader is a device, usually installed close to the door, that detects the unique code in a key and passes it to the door controller where the access decision is made. There are several types of reader suitable for different purposes and environments.

***Note:***

*You can have two Readykey readers on the one reader channel, i.e. an in and out reader. However, if the reader output is in a Wiegand or Magstripe format, you can only have one reader on each reader channel.*

**Readykey Low Profile Reader**

A reader suitable for interior or exterior use.

**Readykey Vandal Resistant Reader**

A stainless steel or brass reader particularly suitable for exterior use, where resistance to abuse is important.

**Readykey Panel Mount Reader**

A reader designed for mounting in a steel panel, such as a door entry system.

**Readykey PIN Reader**

This device requires a PIN number to be entered as well as a key to be presented, as an extra level of security. The need to use a PIN as well as a key can be controlled using a time profile.

**Readykey Slimline Reader**

This device is a slimline version of the standard plus reader, suitable for mounting on door frames, etc.

**Magstripe Reader**

This device converts the code in the magnetic stripe to a format recognizable by the door controller. The door controller supports Magstripe cards which are encoded according to ISO 3554, Track 2.

*Note:* ***Only one Magstripe reader can be connected to each channel.***

**Wiegand Reader**

The door controller supports most standard 26-bit Wiegand formats

***Note:***

*Only one Wiegand reader can be connected to each channel.*

### 2.2.4 Door Controllers

The door controller is the heart of the access control system and it:

- Decides whether a person has access at a particular door and at a particular time.
- Provides power to operate the lock.
- Monitors doors for unauthorized access or door left open.

- Automatically opens and closes doors at certain times.
- Detects tamper conditions at the reader or its own case.
- Controls the 8 on-board relays.
- Programs and monitors any Alarm Event Modules (AEMs) that may be fitted.

### 2.2.5 Connecting Door Controllers

What makes the door controllers so flexible is the ability to link controllers together to allow more doors to be administered. The number of doors that can be administered and the maximum number of personnel that can be controlled, depends on the type of administration system, see *Section 3.0 Administration Systems*.

Door controllers are connected together using Readykey's six-wire bus. This is a proprietary communications link that uses standard six-conductor signal or alarm cable. For full details, see *Section 4.0 Six-Wire Bus*. Each group of door controllers connected using the six wire bus requires one master controller and one or more **slave** controllers.

For smaller systems (16 or 32 door administration systems), one door controller is the master with up to 3 or 7 slave controllers.

For larger systems (up to 128 doors) the Central Network Controller (CNC) becomes the master and **all** the door controllers (up to 32) on the six-wire bus are slaves.

Remote sites, connected to a CNC via an RS-232 serial link, are set up as a 32 door system with one door controller as the master, handling communications with the CNC, and up to 7 slave door controllers.

Every Readykey K2200 Series Controller can be configured as a master or slave. You do not need to purchase different types of door controller.

***Note:***

*If you are integrating the controller with older Readykey systems, he highest firmware version needs to be the first panel on that cluster.*

### 2.2.6 Compatibility

All references in this document to Readykey products assume the following software version numbers, or higher:

**Table 4: Compatible software version numbers**

| Readykey Product | Version # |
|---|---|
| K2200 | 2.11 |
| K2100/K1100 | 3.37 |
| Readykey for Windows | 6.71 |
| Multi-Site Central Network Controller | 2.34 |
| Alarm Event Manager | 1.0 |
| Wiegand Interface | 1.0 |

If you are upgrading an existing system, check with Technical Support at (888) 886-6189 that all the components are suitable and whether any upgrades are required.

The Readykey 2000 Series Controllers perform and function in compliance with BSI PD2000-1 - A definition of Year 2000 Conformity Requirements.

## 2.3 Features

This section describes the features available on the Readykey K2200 Series Controllers.

***Note:***

*Many of the Readykey K2200 Series Controller features are only available using Readykey for Windows.*

### 2.3.1 Summary of Features

The following table provides a summary of the controller features. Fuller details are provided later in this section.

**Table 5: Summary of Features**

| Features | Comments |
|---|---|
| **Reader channels** | The K2200 series has a new terminal which allows you to have an in and out reader (Readykey readers only) on each channel. |
| **Faceplate** | Each controller can be purchased without a faceplate. However, at least one is required for basic configuration |
| **Controller type and software version** | Pressing the **[?]** key on the faceplate displays the controller type, the operating mode and the software version. |
| **Power supply unit** | **Automatic Input Voltage Detection** - PSU operates between 85vac and 250vac.<br>**Lock Output Voltage** 8amp PSU - 12 **VDC** at 2 amps and 24 **VDC** at 1amp.<br>4amp PSU is 12 **VDC** at 1amp and 24 **VDC** at .5 amp. |
| **Memory module** | Physically identical to that used in the Readykey K2100 - only the software is new. |
| **Memory backup battery** | • Maintains the system's memory when all power, AC and external battery backup is removed. Can be replaced without data loss. |
| **Onboard Relays** | There are 8 relays fitted to the Readykey K2200 Series Controllers. K2100 has only 4 relays.<br>Default settings applied when the database is initialized.<br>Readykey for Windows can override settings of relays 1-4 if required. |
| **Alarm event managers** | AEMs can be attached to all controllers in the series. (1 per channel)<br>Relays on the AEMs can be programmed to activate on certain events. (K1200 controllers can have 4 AEMs attached). |
| **Dial-back facility** | The controller can be set to up to dial a CNC when an alarm event happens. (Requires Readykey for Windows). |
| **Protected communications** | Only establishes communications with CNC if master key code from CNC is recognized. (Requires Readykey for Windows). |
| **Remote acknowledgement** | All alarm events generated must be acknowledged at PC to clear if this is set. (requires Readykey for Windows). |
| **Transaction filtering** | Common transactions (e.g. request to exit) can be filtered out and not sent to the administration system. (Requires Readykey for Windows). |
| **Multiple reader formats** | Readers with Wiegand output can now be connected directly to the controller. (Requires Readykey for Windows). |
| **Anti-passback** | Anti-passback is a feature that prevents a key entering an area until it has been used to leave that area. Local and global anti-passback is available.<br>***Note:***<br>*Global anti-passback only available with Readykey for Windows V6 using the K2200 controllers as a master panel.* |
| **Master override input** | When active, this links the override input on slave door controllers to the master controller. If triggered on the master, doors on slaves automatically opened. (Requires Readykey for Windows). |
| **Event time stamping** | Accuracy can be selected to be to the nearest second. Default is to the nearest minute. (Requires Ready for Windows |
| **Download times** | Download times have been significantly improved. Typically, download times for the Readykey K2200 Series Controllers are 30% faster than for the Readykey K2100/K1100. |

### 2.3.2 Appearance

The Readykey K2200 Series Controllers looks a little different than earlier controllers. The board is smaller and has the following additional connectors:

- A **RDR1** and **RDR2** connectors which allow you to connect a second Readykey reader on one channel, giving the option of having an In and Out reader on each door.
- An additional 4 relay outputs.

The inline fuses have also been replaced by on-board resettable fuses - which are reset by unplugging the terminal strip and plugging back in.

### 2.3.3 Faceplate

The Readykey K2200 Series Controllers faceplate is the same as used on the Readykey K2100/K1100 controllers.

The door controllers can be purchased without a faceplate. It is recommended that controllers without faceplates are used only as slaves and that at least one controller on a site has a faceplate. The faceplate is detachable and can be installed on any controller.

### 2.3.4 Software Version and Model Type

Pressing the **[?]** key on the faceplate will produce a display similar to:

**Figure 4: Software Version and Model Type Display**

| |
|---|
| *Nnnn Mn V-yx* |

*In this case a Readykey K2200 with software version 1.0. running in mode 2*

*nnnn = controller type (2244 for K2200, 2222 for K2100)*

*Mn = refers to operating mode*
*n = 0 – for master door controller (standalone system)*
*n = 1 – for MS-DOS system*
*n = 2 – for Readykey for Windows system*
*n = 3 – for slave door controller (any system)*

*Vx-y = is the software version number.*

### 2.3.5 Power Supply Unit

The Power Supply Unit (PSU) is similar to that used in the Readykey K2100. The PSU provides the following features:

- **Automatic input voltage detection** - the new power supply will operate from a AC power input of between 85vac and 250vac. There is no longer a need for separate models for different AC power sources.
- **Lock output voltage** – The lock output voltage can be set to 12 **VDC** or 24 **VDC**.
- **Power indicator** - A red LED within the power supply indicates the presence of ac input voltage.
- **Cooling fan** – A cooling fan is used to assist in keeping the controller and circuits cool.

### 2.3.6 Memory Module

The memory module used in the Readykey K2200 Series Controllers contains the setup configuration and program.

### 2.3.7 Memory Backup Battery

The backup battery is provided to maintain the system's memory when all power, AC and external battery backup is removed. The backup battery can now be replaced without data loss. In order to replace the battery:

- The module **must** be plugged into the door controller.
- The door controller **must** be powered from the AC power line or the sealed lead acid backup battery in the panel case.

### 2.3.8 On- Board Relays

There are 8 relays fitted to the Readykey K2200 Series Controllers. The default settings for these relays are as follows:

- Relay-1: Invalid key on door 1
- Relay-2: Invalid key on door 2
- Relay-3: Invalid key on door 3
- Relay-4: Invalid key on door 4
- Relay-5: door/anti-tamper on any door
- Relay-6: time profile-1
- Relay-7: door left-open alarm on any door
- Relay-8: system tamper

***Note 1:***

*The default settings are applied when the database is initialized either at the faceplate or from a PC.*

***Note 2:***

*Relays 1-4 are fully programmable to respond to a wide range of events when being administered from Readykey for Windows.*

### 2.3.9 Alarm Event Managers

It is possible to program the relays on each AEM to activate on certain events, including time profiles, door alarms, etc. Because of this increased functionality the way the responses are programmed has changed. The details of the programming changes are in the documentation provided with each administration system.

### 2.3.10 Dial-Back Facility

The **Multi-Site Systems administered by a CNC** feature applies only to systems connected through a dial-up (PSTN or TCP/IP) modem to a CNC. If using dial-up modems, you can now set any Readykey K2200 controllers configured as a master to dial back to the CNC in the event of an alarm condition

When administered through Readykey for Windows Version 6, dial-back is available either for:

- Alarm events only, **or**
- Alarm events and buffer full (percentage set by installer).

The dial-back numbers can be entered either at the controller or, if you have Readykey for Windows version 6, at the PC (recommended) and downloaded to the controller.

### 2.3.11 Protected Communications

When selected at the door controller, this feature is 'self-programming' and:

- Allows the next dial-up by the CNC to be accepted.
- Stores the master key sent by the CNC in the Readykey K2200.

When the CNC next dials the master door controller, the controller will only establish communications if the CNC sends the same master keycode as is stored in the door controller.

To set this feature, see *Section 6.1.7 Setting the Modem Connection*, Step 7. *Table 21* shows a better description of Protect Comms.

***Note:***

*Available only on multi-site systems administered by a CNC.*

### 2.3.12 Remote Acknowledgement

Whenever a door alarm occurs at the controller a relay is set. Once the alarm is acknowledged (when it was successfully communicated to a master controller, CNC or PC), the relay is reset.

When using Readykey for Windows, it is possible to set alarms so that the relays are not reset until an operator accepts the alarm at the PC. This is particularly important if you are going to use the more extensive relay programming now available.

To set this feature, see *Section 6.1.7 Setting the Modem Connection*, Step 4. *Table 21* shows a better description of Remote Acknowledgement.

***Note:***

*Available only on multi-site systems administered by a CNC.*

### 2.3.13 Transaction Filtering

On busy systems, performance can be improved by filtering out the less important transactions such as request to exit, free exit, etc. Now there are 5 groups of transactions that the door controller can 'forget', i.e. **not** send to the administration system.

To set this feature, see *Section 6.1.8 Event Mode.*

***Note:***

*Available on all administration systems*

### 2.3.14 Multiple Reader Formats

Readers with a 26-bit Wiegand output can be connected directly to the door controller (see *Figure 27* and *Figure 28* for details).

***Note:***

*If these readers are used, you can only connect one reader per channel. If you require an in and out reader, you must use lock sharing where two reader channels are used to control the same lock.*

### 2.3.15 Anti-Passback

#### Local Anti-Passback

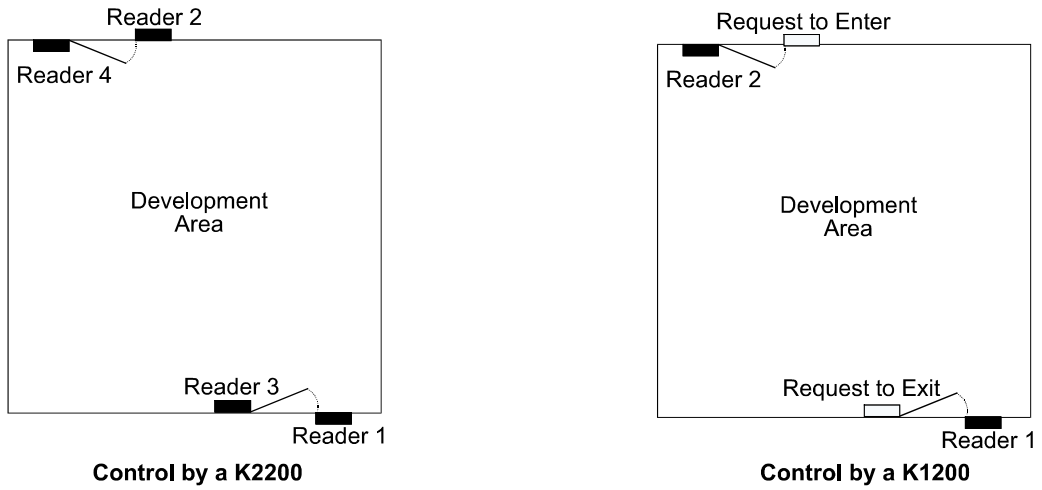
Local anti-passback records which keys have been used to enter an area. This information is then used to determine whether or not a key can be used to enter or leave the area. This can be used to prevent keyholders passing their keys to others to gain entry.

Local anti-passback only operates between the doors on a single door controller with specific readers allocated as entry ("Doors" 1 and 2) and exit ("Doors" 3 and 4) - see Figure 4.

***Note:***

*On the Readykey K1200, which only controls 2 doors, Door 1 is entry and Door 2 is exit.*

**Figure 5: Possible Reader Locations for Local Anti-Passback**




There are two types of local anti-passback available:

1. **Anti-Passback on Entry**. When this feature is active, any key used to enter an area cannot be used to enter the area again unless it has first been used to leave the area. Using the example shown in *Figure 5*, if you use your key to enter development, you cannot use the same key to enter development unless it has first been used to leave development. If the key is used again at an entry door, a `No Entry: Passback` transaction is produced and the lock will not operate. Access will continue to be denied until the key has been used at an exit reader.
2. **Anti-Passback on Exit**. When this feature is active, a key cannot be used to exit an area unless it has first been used to enter the area. This is only available when anti-passback on entry is also active. Using the example shown in Figure 5, if you have not used your key to enter development (e.g. you came in with someone else), you cannot use your key to leave development. If the key is used again at an exit door, a `No Exit: Passback` transaction is produced and the lock will not operate. Access will continue to be denied until the key has been used at an entry reader.

***Note:***

*If door monitoring is used, local anti-passback will only be set if a key is presented and the door is opened. Simply presenting a key will not set local anti-passback. If door monitoring is not used, local anti-passback will be set when a valid key is presented.*

#### Timed Anti-Passback

***Note:***

*Timed anti-passback also works with global anti-passback.*

Timed anti-passback is where you specify the period for which a key is denied access. After the specified period has elapsed the key will be allowed access again, even if it has not been used to leave the area. The time may be set to between 10 and 30 minutes in 5 minute steps (10, 15, 20, etc.).

Using the time-out period means you could use anti-passback without an exit reader. A car park, for instance, may have an entry barrier with a reader. When a key is used to raise the barrier, that key will not be able to gain access again until the time period expires. Provided that genuine use of the key is unlikely to be needed within the time period, no exit reader is required.

#### Global Anti-Passback

Global anti-passback is only available on Readykey for Windows V6 cluster sites, i.e. dial-up sites which have more than one controller on the site. It is **not** available on the standalone system and it will not work with CNC six wire bus sites.

***Note:***

*Global anti-passback is implemented using passback on entry. Passback on exit is only available if you are leaving the site.*

The controller uses the entry and exit areas specified for each reader to determine exactly where you are. Once you enter an area for which global anti-passback has been set, re-entry is not allowed until you have either left the area or until the passback time-out has elapsed.

### 2.3.16 Master Override Input

This feature, when active, "links" the override input of slave controllers to the master controller to which they are attached. If the override input is triggered on the master controller, the doors on any slave controllers with the option set are automatically opened.

### 2.3.17 Download Times

Download times for the Readykey K2200 Series Controllers has been significantly improved. Typically, download times are 30% faster than for the Readykey K2100/K1100 controllers.

### 2.3.18 Compatibility with Previous Models

The Readykey K2200 Series Controllers replace the Readykey K2100/K1100 and is compatible with older Readykey door controllers.

Older Readykey products such as the K2000-N and K2100 may be used as slave door controllers on the six wire bus, along with Readykey K2200 Series Controllers operating as the master or as other slaves. However, some features will only be available on the Readykey K2200 Series Controllers. Readykey

## 2.4 Specifications

### 2.4.1 Environmental

**Table 6: Environmental Specifications**

| | Temperature | Humidity |
|---|---|---|
| **Door Controllers** | +32°F to +104°F (0°C to +40°C) | 0% to 90% RH (non-condensing) |

### 2.4.2 Power Supply

The Readykey K2200 Series Controllers has an integral AC power supply. It is capable of automatically sensing the input voltage and will therefore operate on a 110-120vac or 220-240vac, 50 Hz or 60 Hz AC power supply without the need for switch setting.

The lock output is switch selectable between 12 **VDC** and 24 **VDC**. The lock output voltage applies to all the lock outputs.

Electrical rating for the auxiliary output is 500 mA.

Full load power heat dissipation is 26 W @ 250 and 115 VAC door controllers.

**Table 7: Power Supply Specifications**

| | | |
|---|---|---|
| **AC Line Input** | Voltage | 85 VACvac to 250 VACvac 50/60 Hz power input |
| | Fuse Rating | 3.15 A 20 mm HBC fuse (in AC connector) for 4 Aamp PSU |
| | Connector | Standard IEC connector, right angle socket supplied |
| **Lock Output** | Output Voltage | 12 VDC **VDC** or 24 VDC **VDC**, switch selectable. |
| | Fuse Rating | Re-settable fuse on board, one per channel |
| | Max. Current | 2 amp per channel at 12 VDC **VDC**<br>1 amp per channel at 24 **VDC** |
| **Battery Backup** | Input Voltage | 12VDC **VDC** or 24 VDC **VDC**, depending on lock output |
| | Fuse Rating | Re-settable fuse on board |

### 2.4.3 Cable

**Table 8: Cable Specifications**

| | Type | Distance/ Gauge | |
|---|---|---|---|
| K2001/K 3001 Series Readers | 6 conductor, multi-stranded, unshielded cable | Up to 750 ft (229 m) | 24 AWG |
| | | Up to 1500 ft: (457 m) | 20 AWG |
| | | Up to 3000 ft: (914 m) | 18 AWG |
| Lock Output | 2 conductor, multi-stranded | Depends on distance to lock and the current drawn by the lock.<br>Usually 18 AWG (1.2 mm) will be sufficient. | |
| Six-Wire Bus | 6 conductor, multi-stranded, unshielded cable. | Overall length of bus (max): | 3000 ft. (1000 m) |
| | | Between controllers (max): | 1500 ft. (500 m) |
| | | 18 AWG | |

# 3.0 Administration Systems

This section looks briefly at the administration systems that can be used with the door controllers. In it, we'll look at:

- Faceplate administration (standalone systems).
- PC-based administration (Readykey for Windows systems).

Emphasis is placed on the Readykey for Windows V6 system as this allows you to make full use of all the features provided by the Readykey K2200 Series Controllers.

## 3.1 Introduction

There are several ways of administering Readykey Access Control Systems. Different methods allow greater numbers of doors or personnel to be controlled and door controllers to be located at greater distances from where the system is administered.

This section looks at the following systems:

1. **Faceplate Administration**. For small standalone systems, administration can be carried out entirely via the faceplate. This is only really suitable for small systems (less than 16 doors) with small numbers of personnel.
2. **Readykey for Windows with PC Interface Kit**. This allows up to 32 doors to be controlled from a PC running Microsoft Windows. This provides a user interface which is much easier to use and also provides additional control over the controller relays and AEM inputs and outputs.
3. **Readykey for Windows with a CNC**. This provides the option of having multiple (remote) sites connected via dial-up modems. Both single and multiple site systems are described.

## 3.2 Faceplate Administration – 16-door

**Table 9: See these Documents – Faceplate Administration – 16-door**

| Name of Document | Part Number Bosch | PAC |
|---|---|---|
| Readykey K2200 Series Controllers User Guide | 47491 | 17376 |

The door controllers are normally supplied with a faceplate containing a 48-key keypad, a 16-character display and a key reader. However, it is possible to purchase controllers without a faceplate if required. Readykey recommend that controllers without faceplates are used only as slaves and that at least one controller on a site has a keypad to enable programming. The simplest way of administering an access control system is to use this panel to carry out all the programming. Keys are added by presenting them to the faceplate reader, data is added, modified or deleted using the keypad and display.

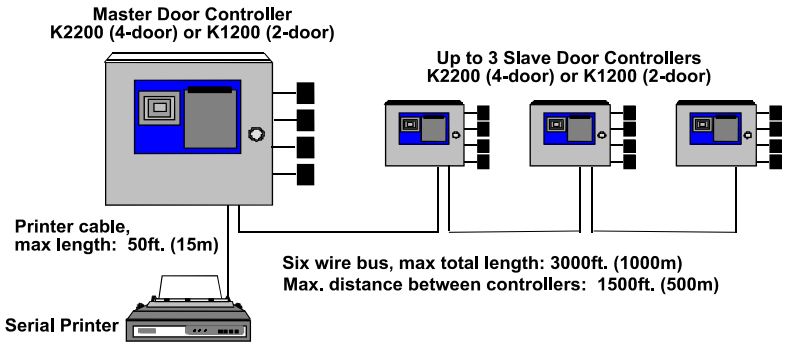
When using this form of administration, a serial printer may be connected to the master controller, this will print events as they occur and can also be used to print the contents of the controller's database.

This system limits are as shown in the following table.

**Table 10: 16-Door Limits**

| | |
|---|---|
| Maximum Number of Personnel | 4000 |
| Maximum Number of Doors | 16 |
| Access Codes | 128 |
| Time Profiles | 32 |
| Editors | 32 (plus master) |
| Auxiliary Alarm Points | 32 per door controller |

**Figure 6: System Diagram – Faceplate Administration**


Master Door Controller
K2200 (4-door) or K1200 (2-door)
Up to 3 Slave Door Controllers
K2200 (4-door) or K1200 (2-door)
Printer cable,
max length: 50ft. (15m)
Six wire bus, max total length: 3000ft. (1000m)
Max. distance between controllers: 1500ft. (500m)
Serial Printer

*The slave controllers can be any of the Readykey K2200 Series Controllers.*

# 4.0 Six-Wire Bus

This section looks briefly at Readykey's proprietary communications link between controllers - the six wire bus. In it, we'll look at:

- Cable specifications for the six-wire bus.
- Possible configurations.
- Controller addressing.

The six-wire bus is Readykey's proprietary communications link for locally connecting door controllers. It uses up to 3000 ft. (1000 m) of standard, unshielded signal cable to connect door controllers. No single length of cable should be longer than 1500 ft. (500 m).

## 4.1 Cable Specification

Readykey recommend that you use multi-stranded, unshielded, 6/8-conductor 24 AWG (0.5 mm / 0.22mm$^2$) alarm or signal cable. If you do use shielded cable, you should reduce the maximum distance by 2 to 3 times depending on the capacitance of the cable.

This is a linear bus and, where possible, should be set up as shown in the following diagram. The total length of the bus should not exceed 3000 ft. (1000 m), and no single length should be longer than 1500 ft. (500 m).

***Note:***

*Branches/spurs are allowed provided they are no longer than 33 ft. (10 m) in length. The length of the spurs should be included as part of the overall length. A maximum of four spurs recommended.*

**Figure 7: Six Wire Bus Wiring Configuration**

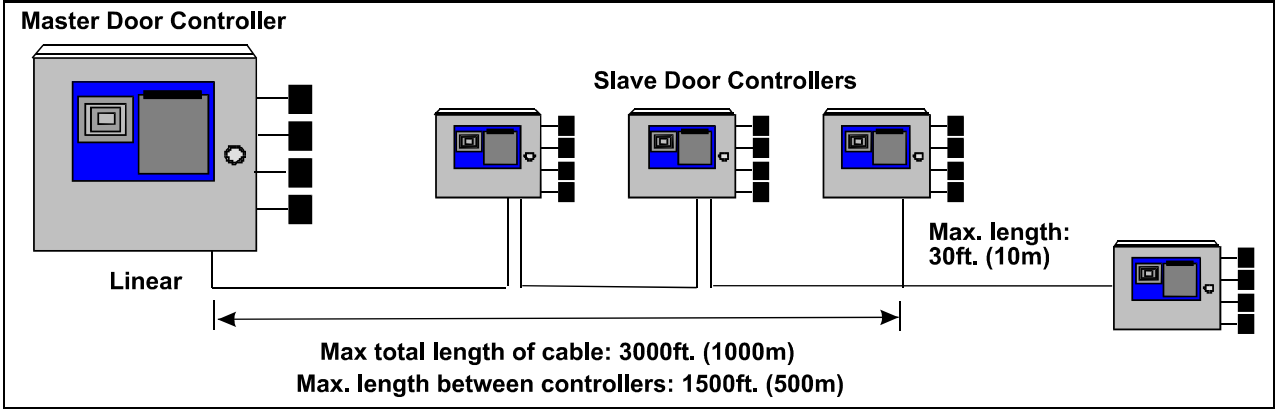
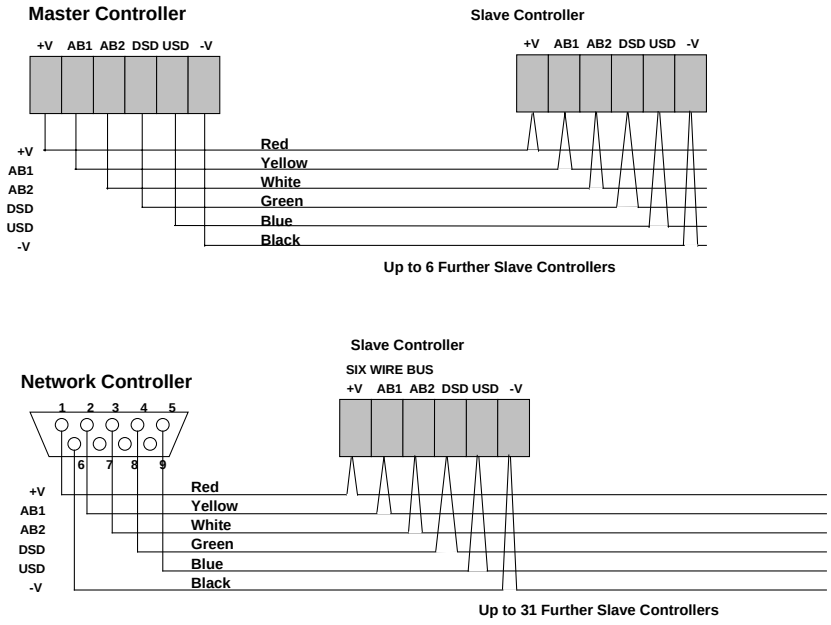


**Figure 8: Six-Wire Bus Wiring**




## 4.2 Addresses

The six-wire bus works by each door controller having its own unique address. The order in which door controllers are addressed does not matter nor do they have to be numbered consecutively. Depending on the type of administration, the following are possible:

- Faceplate Administration - One master controller (system type 0) and up to 3 slave controllers, addressed 2,3 and 4.
- Readykey for Windows 16 Door - One master controller (system type 2) addressed 1 and up to 3 slave controllers (system type 3), addressed 2, 3 and 4.
- Readykey for Windows 32 Door - One master controller (system type 2) and up to 7 slave controllers (system type 3), addressed 2,3,4,5,6,7 and 8.
- Network Controller - Single-site - Up to 32 slave controllers, addressed 1 to 32.
- Network Controller - Multi-site
    - Via the six wire bus: - Up to 32 slave controllers (system type 3), addressed 1 to 32.
    - Via the serial link:
      Up to 32 sites comprising one master controller (system type 2) address 1 and up to 7 slave controllers (system type 3), addressed 2,3,4,5,6,7 and 8.
      Up to 95 sites comprising one slave controller (system type 3).

***Note 1:***

*When being addressed by the CNC, a maximum of 32 controllers can be addressed. When polling, the CNC display shows the address as 0-9 and A-W (10 to 32).*

***Note 2:***

*A multi-site network has sites numbered according to the type of site as follows:*

*Site 1 - via six wire bus, one master and up to 32 slaves.*

*Sites 2-33 - via RS-232, one master and up to seven slaves.*

*Sites 34-128 - via RS-232, one master controller only.*

Site numbers allocated are dependent on the type of site and are not necessarily sequential, e.g. a network could comprise sites 1, 2, 3, 34 and 35.

# 5.0 Installation Details

This section is takes you through the various steps in fitting the door controllers. It contains:

1. A brief description of each controller - what it looks like, dimensions, etc.
2. Details on how to fit and test the hardware - controllers, readers, etc.

## 5.1 Readykey K2200 Series Controllers - Description

### 5.1.1 Multi-Function Door Controllers (K2200 and K1200)

Physically, all the door controllers look alike with the main difference being in the number of reader channels and AEMs that can be supported.

The unit comes complete with a power supply. It can also be ordered with or without a faceplate. There are 2 types of faceplates available, depending on the readers that will be used. Order a K2200, which comes with the K2108 faceplate, (has the Traditional Readykey Reader built in). Order the K2200-KP, which comes with the K3108 faceplate (has the KeyPAC reader built in). Order a K2200-LF, for the controller only, Less Faceplate. It is required that at least one faceplate is used per system.

The following diagrams show the Readykey K2200 on a skirt with and without a faceplate.

***Note:***

*All dimensions of the skirt and metal case are given in the section dealing with installing the controller.*

**Figure 9: Readykey K2200 Door Controller with Faceplate Fitted**

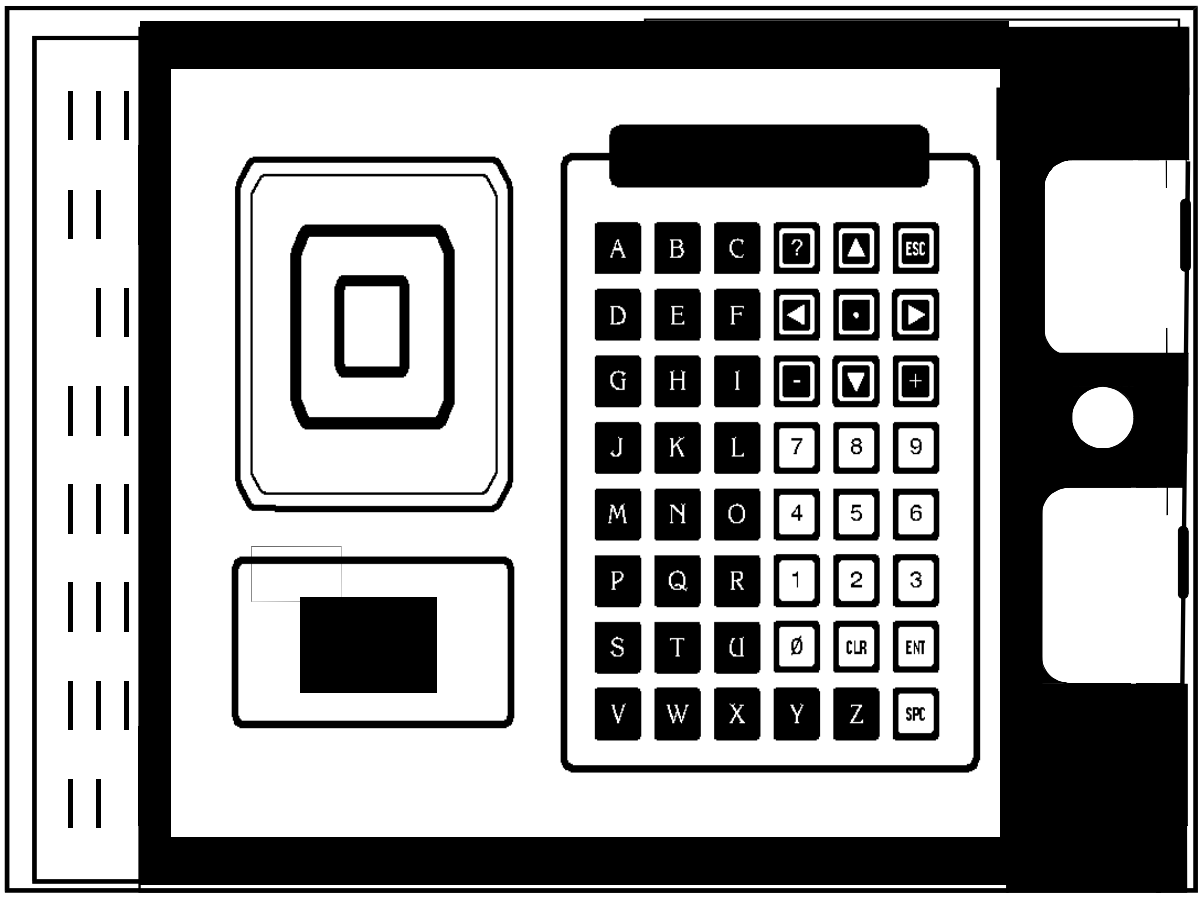
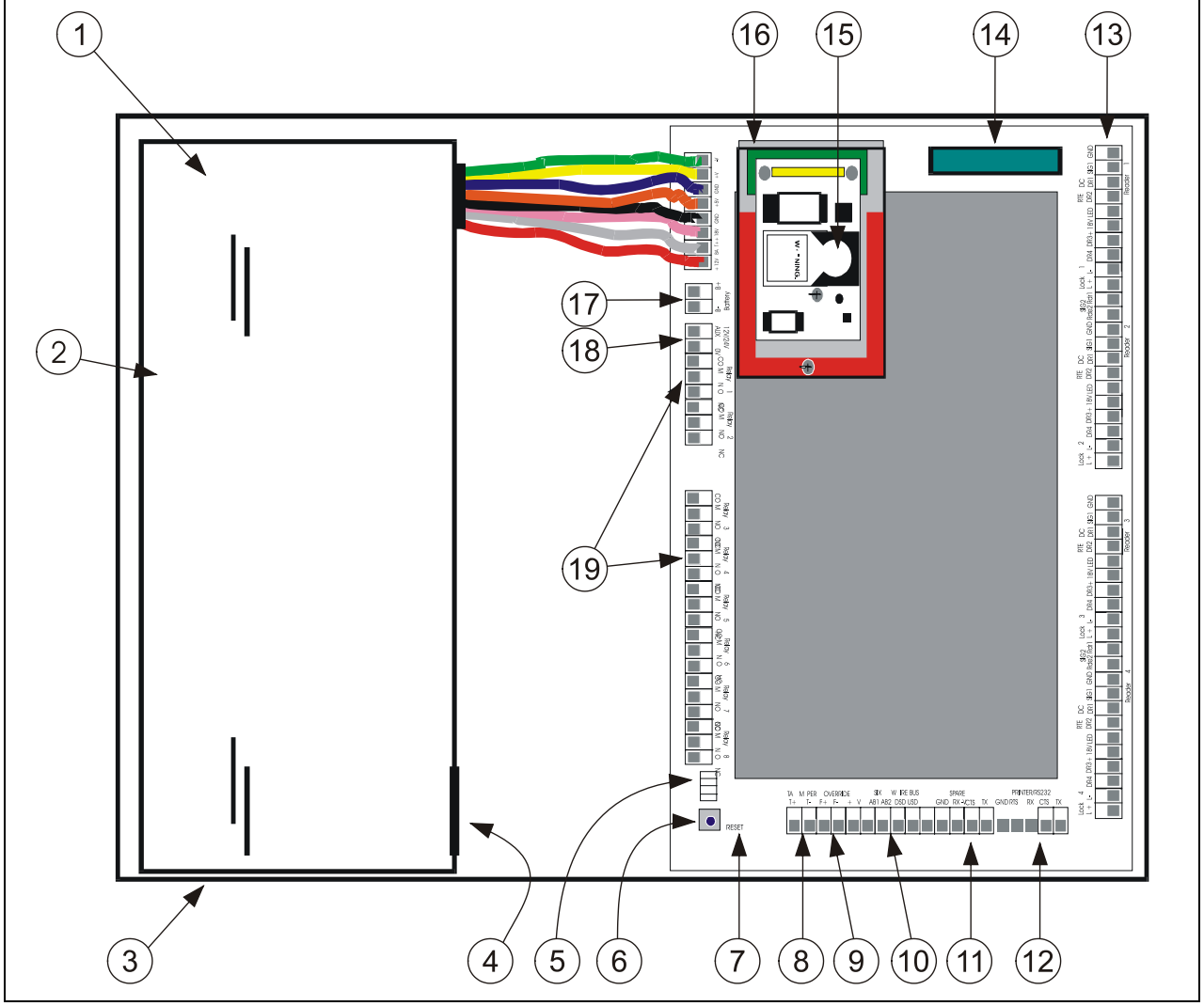


**Figure 10: Readykey K2200 Door Controller with Faceplate Removed**




*1 - Power Supply*
*2 - LED*
*3 - Baseplate*
*4 - Mains Input*
*5 - Option Reset*
*6 - Reset Switch*
*7 - Status LEDs*
*8 - Case Tamper*
*9 - Override*
*10 - Six-Wire Bus*
*11 - Spare*
*12 - RS-232*
*13 - Reader Channels and Lock Outputs*
*14 - Front Panel Connector*
*15 - Memory Battery*
*16 - Memory Module*
*17 - Battery*
*18 - 12 V/24 V Auxiliary Output*
*19 - Relays*

The door controllers consist of:

- A printed circuit board and power supply both fitted to a steel baseplate.
- An optional, removable faceplate fitted to the power supply and baseplate that connects to the circuit board via a ribbon cable.
- A memory module containing the database.
- A second, protective, “cover plate” sitting on top of the main circuit board. This cover protects the components on the main board and has a label, which provides information on the connectors, status LEDs and so on.

#### Power Supply

The metal cased power supply unit is fitted on the left-hand side of the baseplate. This unit will automatically adjust to the local AC power supply, accepting input voltages between 85 VAC and 250 VAC at 50/60 Hz. The power input uses a standard IEC connector; a right-angle socket is supplied.

The output from the power supply is fed to the circuit board by an 8-pole connector.

#### Faceplate

The removable faceplate, if fitted, contains a key reader, on the left-hand side, a keypad and a 16 character display. The panel is secured by two tabs that fit into slots in the power supply on the left-hand side of the baseplate, and by two spring clips on the right-hand side of the panel that attach to the baseplate. A ribbon connector plugs into a socket on the circuit board at the top right of the board.

The faceplate and controller can be purchased as separate items but it is recommended that only slave controllers are purchased without a faceplate. There should be at least one controller (master) on a site with a faceplate.

#### Memory Module

This small board sits on top of the cover plate and contains the software and database memory. A small removable battery maintains the database memory for six months in the absence of mains or battery power.

## 5.2 Introduction

This is a brief outline of the steps that will be taken in the following sections. This describes the installation and testing of the door controller independently of the administration system.

It is possible to test all the reader and lock functions before making any network or communications connections. You are strongly advised to follow the order shown below. In this way you will be able to identify any problems before going on to the next stage.

1. Sitting and Fitting the Controller, including fitting of the Readykey metal case if used.
2. Installation of Readers, including door contacts, request-to-exit switches.
3. Wiring of Locks
4. Testing of Readers, Locks etc.
5. Network connections, six-wire bus and/or serial links where applicable.

***Note:***

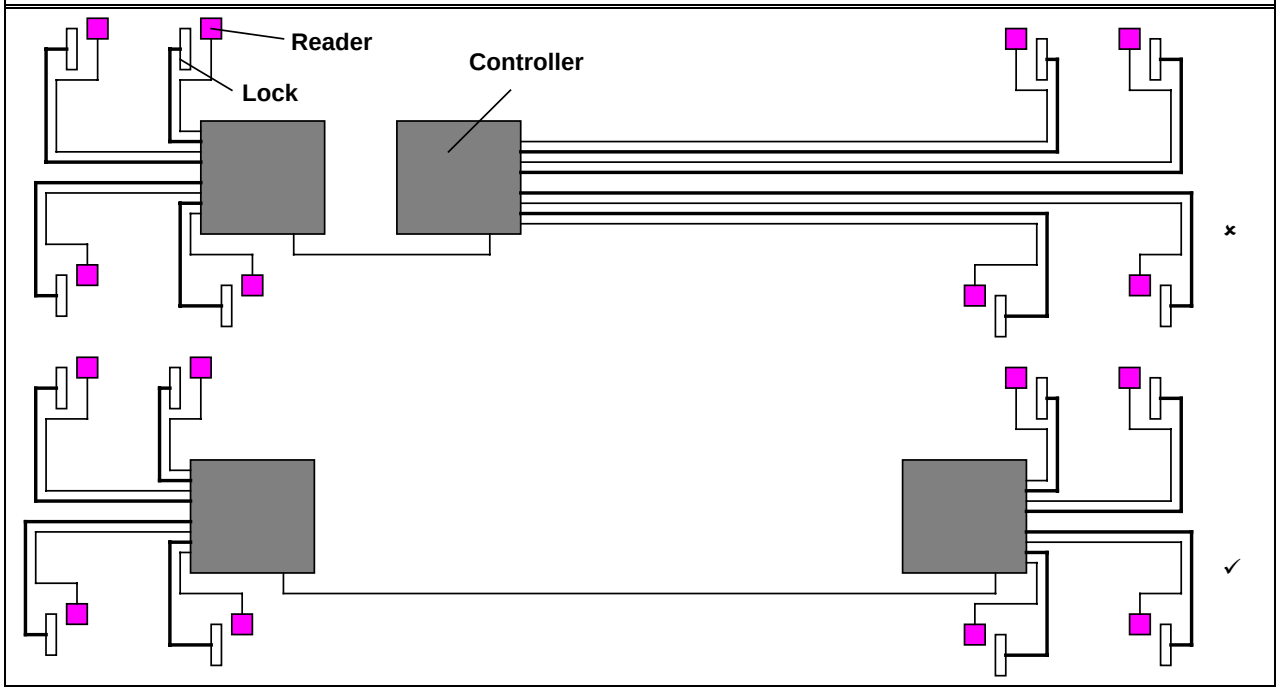
*Further information on administering the K2200 is included in Readykey K2200 Series Controllers User Guide (Radx P/N: 47491, PAC P/N: 17376).*

## 5.3 Installing the Controller

The door controller may be mounted in the metal case (part number K2120 of D8103) supplied separately by Bosch Security. Make sure that access can be gained to the door controller independently of the access control system itself.

If several door controllers are to be connected using the six-wire bus, it is usually better to distribute the controllers so they are closer to the doors. This should reduce the length of cable needed for readers and locks.

**Figure 11: Recommended Wiring Layout**




If the system is to be administered from the faceplate, operators will be spending time programming at the controller. You should therefore ensure that the controller is mounted in a suitably warm, dry and well lit location. The display should be at about eye level for most comfortable use.

### 5.3.1 Metal Case

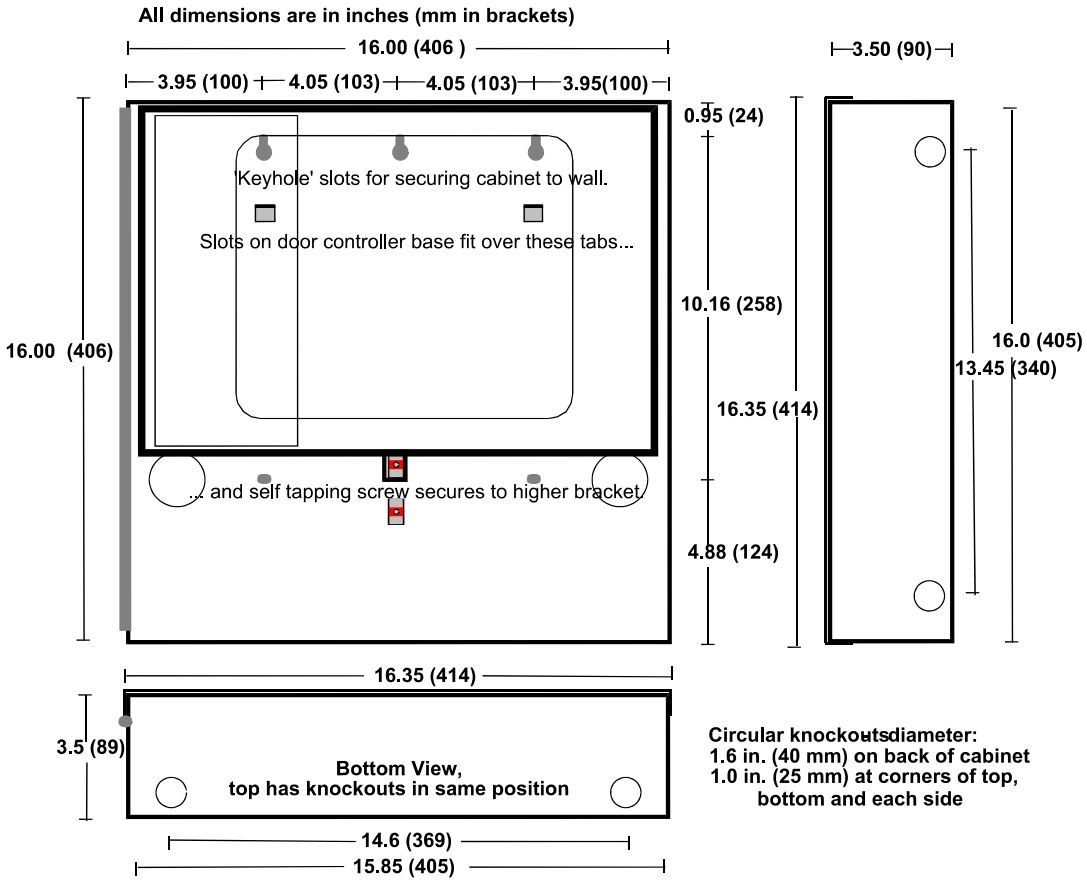
The door controller is contained in a metal case. There are two metal case options. Both options have space for two 12 **VDC** 7AH lead acid batteries if required. The metal case dimensions for each option are shown in Figure 12 and **Error! Reference source not found.**.

The metal case should be fitted to a wall using appropriate fixing screws. Use the central keyhole slot to hang the case initially, and use the remaining fixing holes as a template. There are several knockouts, shown in *Figure 11*, provided for cable routing. Use conduit or trunking when bringing surface mounted cables into the case.

***Note:***

*The metal case is usually locked with only service engineers allowed access.*

**Figure 12: Metal Case**




### 5.3.2 Faceplate

The faceplate is secured by two tabs that fit into slots in the power supply on the left-hand side of the baseplate and by two spring clips on the right-hand side that attach to the baseplate. The ribbon connector should be plugged into the socket on the circuit board at the top right of the board.

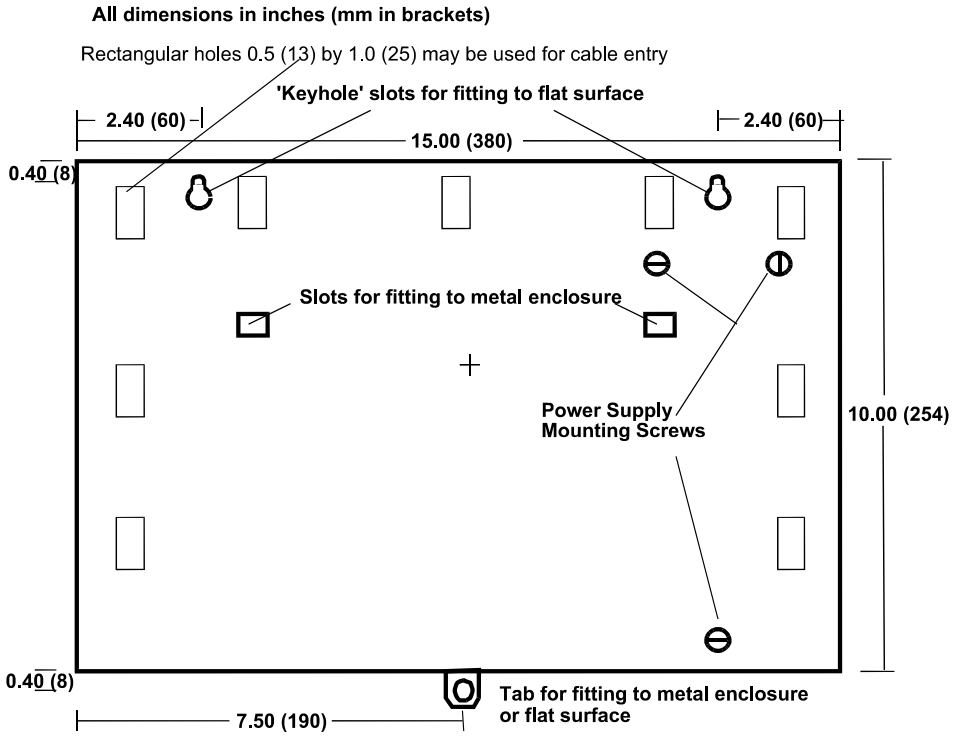
The door controller fits in the metal case using two slots that fit over tabs on the back of the case. You should ease the tabs on the case forward slightly to make locating the door controller easier. The base plate should then be secured using the single tab at the bottom of the baseplate using the self-tapping screw supplied.

### 5.3.3 Fitting Direct to a Flat Surface

You may wish to fit the door controller in an enclosure or cabinet other than one of the standard metal cases.

Figure 13 indicates the position of screw slots and cable entry holes on the door controller.

**Figure 13: Rear View of Door Controller Base Plate**


All dimensions in inches (mm in brackets)
Rectangular holes 0.5 (13) by 1.0 (25) may be used for cable entry
'Keyhole' slots for fitting to flat surface
2.40 (60)
2.40 (60)
15.00 (380)
0.40 (8)
Slots for fitting to metal enclosure
Power Supply
Mounting Screws
10.00 (254)
0.40 (8)
Tab for fitting to metal enclosure
or flat surface
7.50 (190)

### 5.3.4 Power Supply

The database is stored in battery-backed memory and will be preserved whether the controller is powered or not. This backup will last up to 3 years provided that the controller is normally powered. The battery, located on the memory module, can be replaced without losing data. This is recommended every 3 years.

***Note:***

*The backup will be preserved for 6 months if the controller is not powered.*

#### AC Supply

AC power, between 85 VAC and 250 VAC, 50/60 Hz, should be supplied to the controller through an illuminated, unswitched outlet. A right angle IEC plug is supplied.

A GROMMET MUST BE FIXED TO THE HOLE THROUGH WHICH THE AC POWER WOULD PASS. THIS IS TO PREVENT THE METAL CASE CUTTING THE AC LEAD IF THE LEAD IS PULLED ON.

#### Power Indicator

A red LED is situated within the power supply. It is visible through a small hole about 3 in. (75 mm) from the top on the left-hand side of the power supply case.

If the door controller is operating off the AC power supply, whether the battery is connected or not, **the LED will be lit**.

If the AC power supply fails and the unit is running from the backup battery, **the LED will be extinguished.**

### 5.3.5 Lock Output Voltage

The lock output voltage is set for all doors on the controller using a switch accessible through the top edge of the power supply. 24VDC allows 1 amp of current draw per output, 12VDC allows 2 amps of current draw per output.

### 5.3.6 Battery Backup

The 12VDC 7AH battery (if in a fully-charged, good condition) provides approximately 2.0 hours of standby time for a fully loaded system.

A battery charging facility is available that can provide up to 0.5 A at 13.8 VDC or 0.25 A at 27.6 VDC.

**Door Controllers**

The battery backup voltage must match the lock output voltage, i.e. 12 V VDC or 24 V VDC. You may use two 12 VDC batteries in series to provide 24 VDC.

The capacity of the battery required should be calculated based on:

- The current consumption of the door controller (1 A).
- The current consumption of the devices attached to the reader channels (up to 800 mA).
- The current consumption of the locks when operating normally (up to 2 A each).
- The type of lock, continuous (fail-safe) or intermittent (fail-secure).
- The length of time the system should operate without mains power.
- The following tables will help you estimate the current.

**Lock Supply Current**

For continuous, or fail-safe locks the continuous lock supply current is the current drawn by the lock. For fail-secure locks, however, you need to estimate the equivalent continuous current by using the following equation:

**Figure 14: Continuous Current Estimation Equation**

$$CLC = \{\text{Lock Current Rating} \times LRT\} \times NOP / 3600$$

*where*

*CLC = Equivalent Continuous Lock Current*
*LRT = Lock Release Time (in seconds)*
*NOP = Number of Operation per hour*

The lock current rating should be indicated in the lock specification.

***Example:***

*A 500 mA lock strike with a 5 second lock release time, operating 50 times an hour would give:*

*CLC = (500 x 5) x 50 / 3600 = 35 mA*

***Note:***

*If you have any doubt about the current drawn by a lock, you should measure it at the controller using a meter.*

The maximum current that should be drawn from each lock output is:

2.0 A at 12 VDC 1.0 A at 24 VDC

In Table 11 record the type and current consumption of each lock fitted.

**Table 11: Continuous Lock Supply Current**

| Channel | Type: Continuous/ Intermittent | Continuous Lock Current |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| | Total = | |

**Reader Supply Current**

There is a maximum of 200 mA available per reader channel on the 18 V supply. Readykey readers of all types draw approximately 90 mA each continuously. If you fit Alarm Modules or AEMs, a reader combiner or Wiegand interface unit, you should ensure that the maximum current available, 800 mA, is not exceeded.

In the table at the right record a current consumption for each device fitted:

**Table 12: Total Reader Channel Current**

| | Channel 1 | 2 | 3 | 4 | |
|---|---|---|---|---|---|
| Reader Current 1<br>35 mA (see Note 1) | | | | | |
| Reader Current 2<br>100 mA (see Note 2) | | | | | |
| Wiegand\Magstripe<br>Reader 50 mA | | | | | |
| Module Relays<br>30 mA | | | | | |
| | | | | | |
| **Total:** | | | | | Must not exceed<br>200 mA/channel |

***Note 1:***

*Reader Current 1 applies to the readers with flying leads*
*(15 mA idle, 35 mA active).*

***Note 2:***

*Reader Current 2 applies to the readers with screw terminals as well as the panel mount reader.*

***Note 3:***

*When using a reader combiner, you should include the current of the combiner in its column plus the total current for both readers in the reader column.*

***Note 4:***

*Only include a value for the reader current if the Wiegand reader is powered from the Wiegand interface unit's 5 VDC output or the 18 VDC reader supply*

***Note 5:***

*Include 40 mA for each AEM that is connected to a reader channel.*

### Determining Total Power

The door controller itself consumes 1 A before the addition of any readers or locks.

For each 100 mA of reader channel current, as determined above, an additional 150 mA should be allowed. This is due to several factors involved in the generation of the 18 VDC VDC supply.

**Table 13: Determining Total Power**

| | | |
|---|---|---|
| Door Controller | 1 | A |
| | | A |
| | | A |
| **Total:** | | A |

The above figures are all stated in Amps, 1 A = 1000 mA.

### Alarm Controller

The capacity of the battery required should be calculated based on:

- The current consumption of the alarm controller (1 A).
- The current consumption of the devices (AEMs, detectors, etc.) attached to the controller, up to a maximum of 800 mA

The length of time the system should operate without mains power.

***Note:***

*Each AEM can be powered from the controller or via a separate power supply. The current drawn by each AEM is a maximum of 40 mA.*

### Standby Battery Requirements

For door controllers, the battery voltage should match the lock output voltage.

Now that you know the total continuous current requirement of the door controller plus readers, locks and ancillaries, you should multiply this figure by the number of hours standby needed.

In the enclosure supplied, there is room for two 12 V 7 Ah batteries. If this does not provide sufficient backup, the batteries must be located outside the case or the controller mounted in a larger case.

***Note:***

*A door controller with a continuous current of 2 A will require at least a 4 Ah battery to provide 2 hours cover (2 A x 2 hours = 4 Ah).*

The Ah rating of a battery is usually determined when discharged over a 10 or 20 hour period. If a fully charged battery is discharged over a shorter period than this, as in the example above, it will last for less time than its rating suggests. You should consult the battery manufacturer's correction factor charts to determine a more accurate figure. than expected.

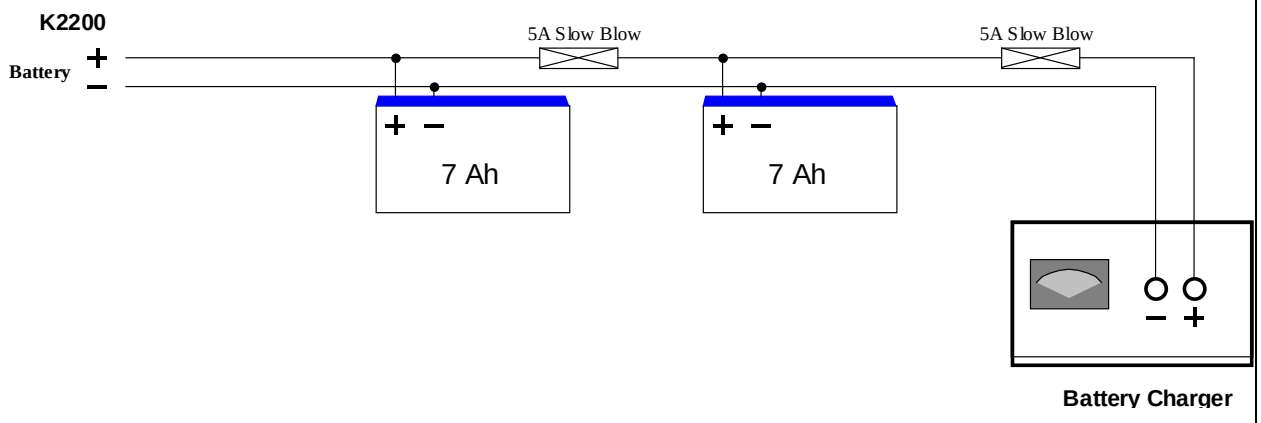
### Using an External Charger

In order that a fully discharged battery can recover to a fully charged state within 24 hours, you should consider using an external charger when using more than a 7 Ah battery. Use the wiring shown below.

***Note:***

*The auxiliary battery charger output must not exceed 2 VDC over K2200 battery output.*

**Figure 15: Using an External Battery Charger**



## 5.4 Installing Readers and Locks

All the features described below can be programmed and tested, where necessary, at the faceplate. Details of how to do this are given in Section Error! Reference source not found.. However, if the door controller is going to be administered from a PC-based system, you will need to program these features from there as well. You are advised to use the faceplate to test the installation of the door controller, readers and locks and then, once communications are established, initialize the door controller and program the features at the administration PC.

How to fully commission a PC-based system is described in the documentation supplied for that system.

### 5.4.1 KeyPAC K3000 Series Readers

These readers read KeyPAC electronic keys and ISO thickness ID cards they do not read the earlier Readykey ID devices. Make sure that you specify KeyPAC whenever you purchase electronic keys and ID cards.

**KeyPac Low Profile Reader - K3001 + K3001W**

A reader suitable for interior or exterior use and comes in both black and white.

**KeyPac Vandal Resistant Reader - K3002 + K3002B**

A stainless steel or brass reader particularly suitable for exterior use, where resistance to abuse is important.

**KeyPAC Mullion Reader - K3003 + K3003W**

This device is a slimline version of the low profile reader, suitable for mounting on door frames etc. Comes in both black and white.

**KeyPAC Extended Range Reader - K3004 + K3004W**

This device is weather resistant and suitable for indoor and outdoor use. Keys and Cards are read at a distance of up to 10 inches. Comes in both black and white.

### 5.4.2 K2000 Series Readers

These readers read Readykey ID electronic keys and ID cards. They do not read the newer KeyPAC elctronic keys and ID cards. Make sure that you specify PAC ID (not KeyPAC) whenever you purchase electronic keys and ID cards.

**Readykey Low Profile Reader - K2001 + K2001W**

A reader suitable for interior or exterior use and comes in both black and white.

**Readykey PIN Reader and Readykey Surface Mount - K2001-P**

This device requires a PIN number to be entered, as well as a key to be presented, as an extra level of security. The need to use a PIN as well as a key can be controlled using a time profile.

**Readykey Vandal Resistant Reader - K2002 + K2001B**

A stainless steel or brass reader particularly suitable for exterior use, where resistance to abuse is important.

**Readykey Mullion Reader - K2003 + K2003W**

This device is a slimline version of the low profile reader, suitable for mounting on door frames etc, comes in both black and white.

**Readykey Panel Reader- K2025**

A reader designed for mounting in a steel panel, such as a door entry system or elevator cabs.

**KeyPAC ID Devices**

The KeyPAC range will not work with the earlier Readykey devices. The following are part codes for compatible electronic keys and ID cards:

- K3010-10- KeyPAC Prox Keys, packs of 10
- K3011-10- KeyPAC Prox Cards, packs of 10
- K3011M-10- KeyPAC Prox Cards with Magnetic Stripe, packs of 10

**Readykey 2000 Series ID Devices**

The K2000 Series devices will not work with the newer KeyPAC devices. The following are part codes for compatible electronic keys and ID cards:

- K2010-10- Electronic Key, packs of 10
- K2011B-10- Cards with logo, packs of 10
- K2011M-10- Cards with Magnetic Stripe, packs of 10
- K2011W-10- Cards, White (no logo), packs of 10

The Readykey K2200 Series Controllers have either four or two reader channels. Each reader is wired independently using up to 3000 ft. (1000 m) of 6-conductor cable.

**Reader Wiring**

**Figure 16: Reader Wiring Diagram - Terminals**

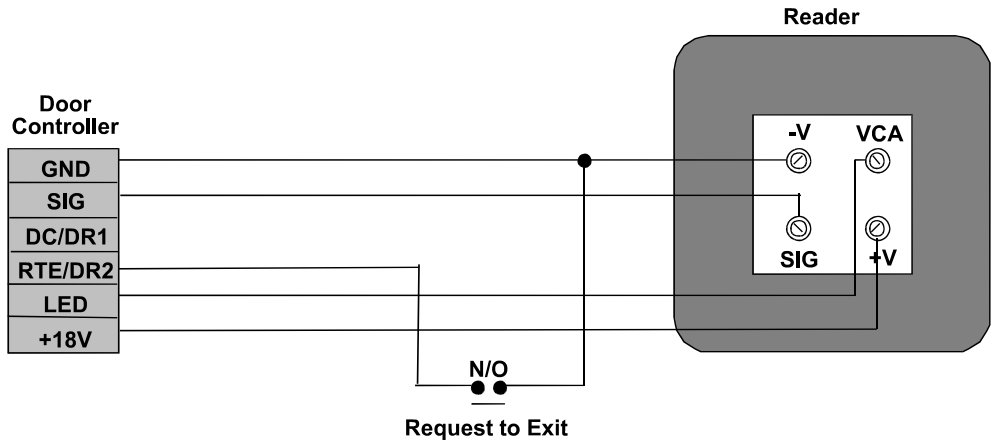



**Figure 17: Reader Wiring Diagram - Flying Lead**

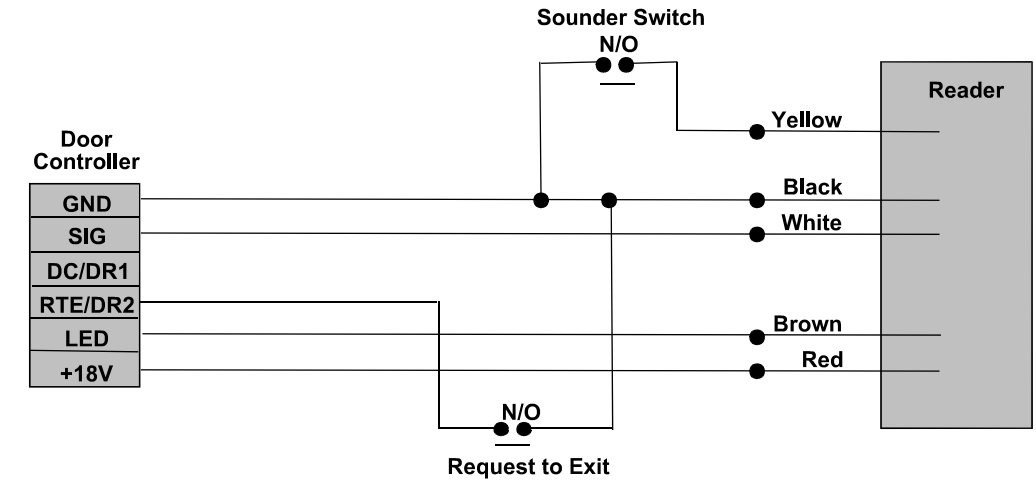
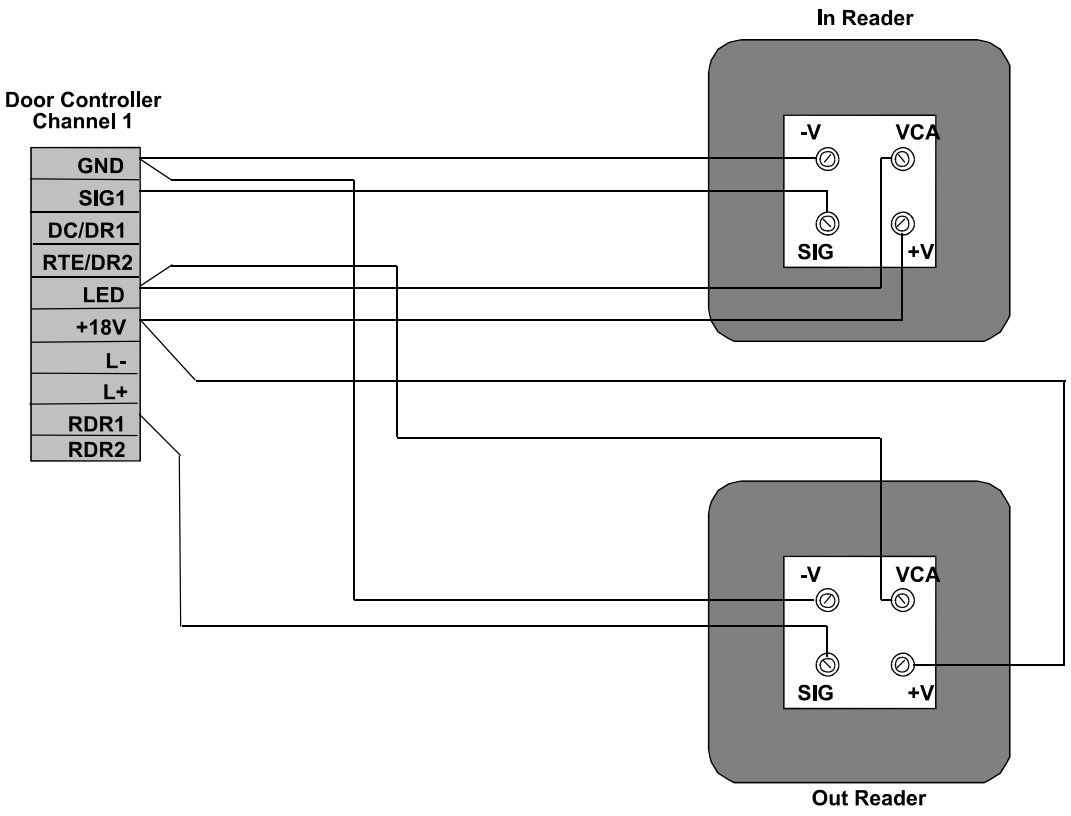


**Figure 18: Reader Wiring Diagram - In/Out Readers**




Use the most appropriate reader for the location bearing in mind, internal or external, vandal resistance, decor, panel mounting, etc.

***Note:***

*The in/out reader option is only available if Readykey readers are used. If you are using Wiegand or Magstripe readers and require in/out readers, you must use lock sharing where two reader channels operate the same lock.*

### Reader Fitting

See the documentation supplied with each Readykey reader for specific details for fitting that type of reader.

In general:

- Readers should be mounted at a convenient height, usually at about the height of a door handle, on the unhinged side of the door.
- Readers should be mounted at least 3.3 ft. (1 m) apart to prevent any interaction between them. Be particularly careful with this distance when placing readers on each side of the same door.
- Consider future service requirements such as access to cables, etc.

### Reader Cabling

Use unshielded, multi-stranded, tinned copper signal cable, the type commonly used in alarm installations. A minimum of 24 AWG (0.5 mm), cable is required (reader, request to exit and door contact). For example, some readers have a sounder which require an additional core to make use of the feature.

The maximum reader cable length is dependent on both the reader type and cable gauge as detailed below. For example, the cable length for the Mullion and standard plus readers is:

Full details are provided in the documentation supplied with each reader.

**Table 14: Appropriate Wire Gauge based on Length**

| Length | Wire Gauge |
|---|---|
| up to 750 ft. (250 m) | 24 AWG (0.5 mm) |
| up to 1500 ft. (500 m) | 20 AWG (1.0 mm) |
| up to 3000 ft. (1000 m) | 18 AWG (1.2 mm) |

Four conductors are used to connect the reader itself, the other conductors can be used for the optional request to exit and door monitoring signals (see *Section 5.4.3 Request to Exit (DR2)* on page 34 and see *Section 5.4.4 Door Monitoring (DR1)* on page 34).

The readers are not prone to electrical interference, however avoid routing cable close to heavy load switching cables and equipment. If this is unavoidable, cross the cable at right angles every 3.3 - 6.6 ft. (1 - 2 m).

### Reader Connections

All Readykey readers have 4 visible terminals, +V, VCA, SIG and -V, or a flying lead. Each reader is connected to one of the 4 reader channel terminal blocks on the door controller. Each reader channel has 2 further connections, DR1 and DR2. These provide door/cable monitoring and request to exit inputs respectively.

#### Readers with Terminals

**Table 15: Readers with Terminals**

| Connects to Controller | Reader Markings | Description |
|---|---|---|
| +V | +V | Supply: 18 V |
| LED | VCA | Valid code accepted, illuminates the green LED at the reader when a valid key is presented. |
| DR2 | | Request to exit. |
| DR1 | | Door monitoring |
| SIG | SIG | The signal from the reader to the controller. |
| GND | -V | Supply: 0 V |

#### Readers with Flying Leads

**Table 16: Readers with Flying Leads**

| Connects to Controller | Color | Signal | Description |
|---|---|---|---|
| GND | Black | -V | Power and signal return |
| +18V | Red | +12V | Unregulated 12 VDC input 9-28 VDC, 35 mA Max. |
| GND | Yellow | SNDR | Sounder input, active low. Pull to ground to activate sounder |
| SIG | White | SIG | Signal output. connect to door controller reader channel SIG |
| | Green | n/c | Not used |
| LED | Brown | VCA | Valid code accept, operates LED. Connect to door controller reader channel, LED. |
| | Blue | DR1 | Reader tamper connection (not required on the Readykey K2200 series) |

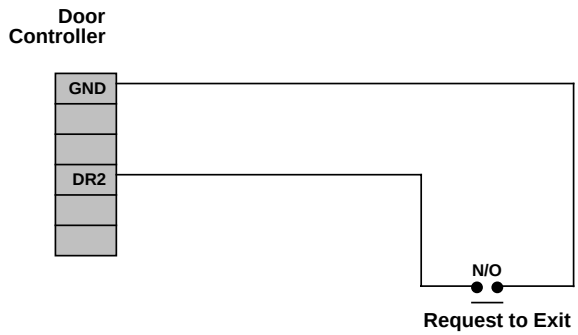
***Note:***

*If an in\out reader is being used (Readykey readers only), the Sig from the second reader connects to the relevant Rdr connection - Rdr1 on Channel 1, Rdr2 on Channel 2, etc., see Figure 18,*

### 5.4.3 Request to Exit (DR2)

**Wiring Detail**

**Figure 19: Request to Exit Wiring Diagram**




Connecting DR2 to ground (GND) will always operate the lock; ensure that the request to exit wiring is not accessible from outside the secure area (e.g. if the reader is removed from the wall, the request to exit wiring should not be exposed).

The Request to Exit switch allows persons within the secure area to leave by signaling the door controller to operate the lock without using a key. The switch is necessary when door monitoring is used (see *Section 5.4.4 Door Monitoring (DR1)*) to enable the controller to distinguish between a forced door and a valid exit.

The switch should be 'normally open' which closes momentarily when pressed.

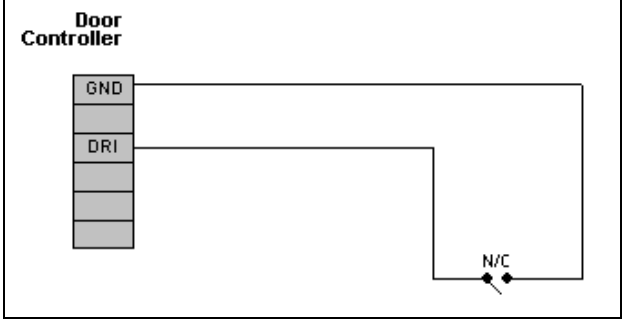
The following should be noted:

- It is possible to locate the switch away from the door, at a reception desk or as part of a door entry system. In which case, it is possible to change the event report to Request for Entry.
- More than one switch can be used if wired in parallel.
- If an attempt is made to keep the door open by holding down the Request to Exit switch then the door will lock after 5 cycles of the lock release time and an RTE Button Held Down report is produced.

### 5.4.4 Door Monitoring (DR1)

**Wiring Detail**

**Figure 20: Wiring for Door Monitoring**




#### Door Monitoring

The door controller has the ability to monitor a door contact allowing:

- **Unauthorized Access Alarms** giving warning of a forced door.
- **Door Left Open Warning** after a set period of time. The time is set when the controller is programmed.

**Cancellation of Lock Release Time** allows the door to lock after someone has passed through even though the lock release time has not expired

#### Door Contact

The door contact should be a normally closed switch that is open whenever the door is open. Care should be taken when fitting door contacts to ensure that they operate only when the door is opened and close only when it is secure again.

To help prevent false alarms:

- Keep reed switches away from large magnetic fields, such as those generated by magnetic locks. This is a particular problem with metal door frames.
- Ensure that the switch does not operate if the door moves in its frame, in draughty or windy conditions.

An efficient door closer should be fitted that secures the door once someone has passed through.

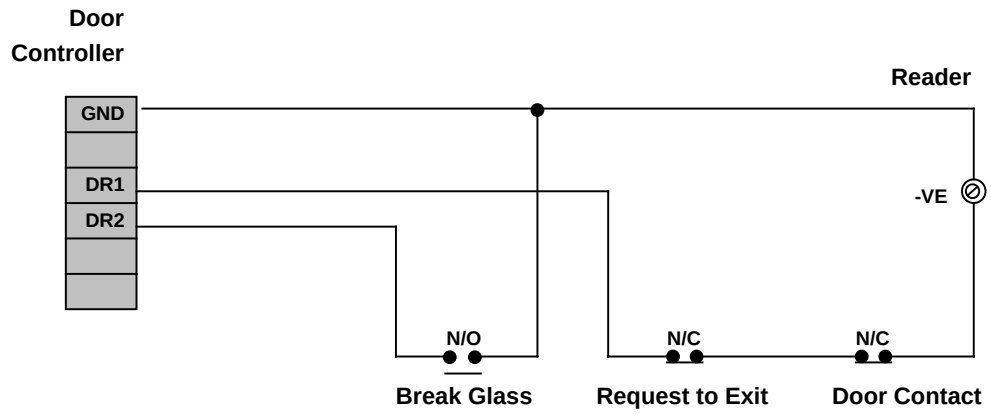
### 5.4.5 Emergency Override/Free Exit

There is a special case where both the DR2 and DR1 signals are interpreted differently to the way described for door monitoring. The DR2 signal is used to monitor an emergency switch, such as a break glass, and DR1 provides a Free Exit report.

***Note:***

*When this feature is used there is no door alarm monitoring. For details on how to enable this feature, refer to Readykey K2200 Series Controllers User Guide (Bosch P/N: 47491, PAC P/N: 17376).*

**Figure 21: Emergency Override / Free Exit Wiring**




**Special Case for Emergency Override and Free Exit**

#### Emergency Override

When connected as shown in Figure 21, operating the break glass will open the door and produce an `Emergency Override On` report. When the switch is restored an `Emergency Override Off` report is produced and the door will be locked again.

THIS FEATURE SHOULD NOT BE FITTED AS THE SOLE MEANS OF ESCAPE.

#### Free Exit

When this option is set, pressing the **Request to Exit** switch will produce a `Free Exit` report. The door contact will allow door left open warnings to be produced.

A normally closed switch may be used to operate as a request to exit switch, in addition to having a door contact switch in series (see *Figure 21*). An additional special lock mode (Option 8) needs to be set, in addition to option 2, to allow this feature (see *Table 24*).

***Note 1:***

*Using this arrangement, the lock will operate whenever DR1 is opened - this means that care should be taken that the door contact cannot be broken from the secure side of the door.*

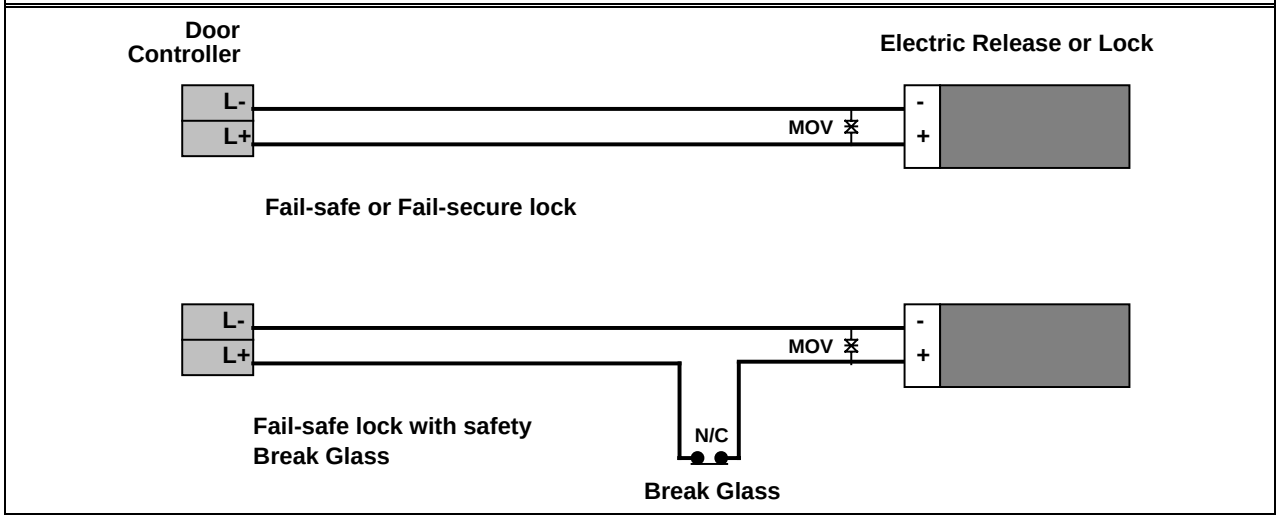
***Note 2:***

*As free exit was designed to work with a door contact or pushbar the door contact "bounce time" is applied and the response will be slow if used like an Request to Exit switch (1.25 seconds).*

### 5.4.6 Lock Output

**Wiring Diagram**

**Figure 22: Lock Output Wiring**




All locks should be fitted according to the manufacturer's instructions.

The door controllers provide a lock output for each reader channel. These outputs are capable of providing either 12 VDC or 24 VDC. The lock output on each channel must not be able to exceed 2.0 amps at 12 VDC or 1.0 amp at 24 VDC. The lock voltage is set using a jumper on the right hand side of the power supply

Each lock output is protected by resettable fuse on the controller. Two status LEDs are also provided for each lock output. These operate as follows:

- Fail Safe Locks. Both the red and green LEDs are normally off. When a valid key is presented to a reader, both LEDs come on for the duration of the lock release time. A fault is indicated when only the red LED is lit.
- Fail Secure Locks. Both the red and green LEDs are normally on. When a valid key is presented to a reader, both LEDs go off for the duration of the lock release time. A fault is indicated when only the red LED is lit.

Each output can be independently set as fail-safe (power to lock) or fail-secure (power to unlock).

The cable between the door controller and the lock should be of such a gauge as to provide at least the minimum voltage required to operate the lock. The resistance of the cable and the current drawn by the lock will determine the type of cable.

#### Lock Supervision

All locks must be fitted with a means of suppressing back Electro-Motive Force (EMF) 'spikes' generated by most electric releases, especially magnetic locks. All Readykey door controllers and readers are supplied with MOVs (metal oxide varistors). If large currents are used (i.e. >1 A) use the large MOV supplied with the door controller. If small currents are used (i.e. <1 A) use the small MOV supplied with the reader.

The MOV will prevent long term damage being done to the door controller. Whenever possible this device should be fitted across the lock terminals. If for any reason, the lock terminals are inaccessible, the MOV may be fitted across the lock output.

#### Safety

Any door that is considered a fire door or is on an escape route **must** have some means of overriding the electric release in an emergency. Usually this is achieved by the use of fail-safe locks (power to lock) fitted with a normally closed break-glass **in the lock supply**. When the break-glass is operated, the supply to the lock is broken and the door will be released without any intervention from the door controller.

### 5.4.7 Lock Sharing

***Note:***

*This is only required when the in/out readers do not have a Readykey output (i.e. Wiegand or Magstripe readers). Where the readers have a Readykey output you can have two readers on the one channel.*

When using a reader on each side of a door to monitor both entry and exit, it is only necessary to feed one lock. Both the entry and exit reader will operate the same lock. To achieve this arrangement two reader channels are paired, Channel 1 and Channel 2 may be considered as entry readers, Channel 3 and Channel 4 as exit readers.

When using lock sharing (also called channel pairing, or interlock) in this way, you will also generate Entry Authorized and Exit Authorized reports instead of Access Authorized.

**Table 17: Reader Channel Lock Sharing**

| Reader Channel | Operates… | Reports… |
|---|---|---|
| Channel 1 | Lock Output 1 | Entry Authorized |
| Channel 2 | Lock Output 2 | Entry Authorized |
| Channel 3 | Lock Output 2 | Exit Authorized |
| Channel 4 | Lock Output 1 | Exit Authorized |

Each channel pair may be programmed independently.

If Channel 1 and 4 are paired, Lock 1 will operate when a valid key is presented to either Channel 1 or Channel 4, similarly Lock 2 will operate if Channel 2 and 3 are paired.

***Note:***

*As the Readykey K1200 has only two reader channels, Channel 1 may be considered an entry reader, Channel 2 is the exit reader; both will operate Lock Output 1.*

#### 5.4.8 PIN Reader

A Readykey PIN reader operates exactly as a normal Readykey reader except that the user has to enter a PIN after presenting their key.

**PIN Reader Time Profiles**

It is possible to set a time profile so that a PIN is not required at certain times, during the day for instance, but is required at all other times.

Refer to the Readykey *K2200 Series Controllers User Guide* (Bosch P/N: 47491, PAC P/N: 17376) for details on using time profiles with a PIN Reader.

## 5.5 Other Connections

This section includes relay outputs, case tamper and override input. All these connections are made at removable terminal blocks along the bottom and left edge of the circuit board.

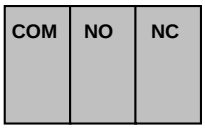
Also included in this section are brief details on the alarm event manager. This can be connected to any door controller.

#### 5.5.1 Relay Outputs

There are 8 relay outputs fitted to the left-hand edge of the door controller, each consists of a removable terminal block with Common, Normally Open and Normally Closed contacts. Depending on the type of administration system, these relays can be programmed to operate as a result of particular events happening.

Each relay is capable of switching 12 VDC at 1 or 24 VDC at 0.5 A.

**Figure 23: Relay Outputs**




*Relay n where n = 1 to 8*
*COM = Common*
*NO = Normally Open*
*NC = Normally Closed*

Without any programming, they will respond as follows:

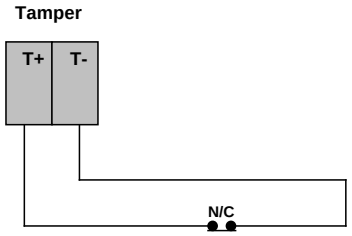
**Table 18: Relay Responses**

| Relay | Response |
|---|---|
| 1 | Operates in the event of an invalid key being presented on door 1. |
| 2 | Operates in the event of an invalid key being presented on door 2. |
| 3 | Operates in the event of an invalid key being presented on door 3. |
| 4 | Operates in the event of an invalid key being presented on door 4. |
| 5 | Operates in the event of an Unauthorized Access at any door on the door controller. |
| 6 | Operates along with time profile 1. |
| 7 | Operates in the event of a `Door Left Open` at **any** door on the door controller. |
| 8 | Operates in the event of a Case Tamper (see *Section 5.5.2 Case Tamper Input* on page 37). |

#### 5.5.2 Case Tamper Input

This is a normally closed input that may be connected to a tamper switch fitted to the controller case. If it is connected to a **Tamper** switch, a `Case Tamper` alarm is generated when the case is opened.

**Figure 24: Case Tamper Wiring**



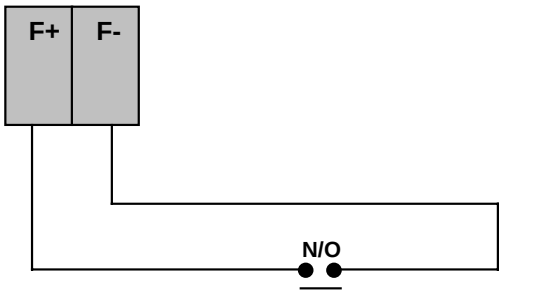

***Note:***

*This is a normally closed switch therefore you should use a short piece of cable to link the two terminals before powering up. If not, you will get an immediate Case Tamper alarm.*

### 5.5.3 Override Input

This is a normally open input that, when closed, will cause all the locks on the controller to release. This may be fitted to the output of a **Manual Emergency Override** switch. All the doors on the door controller will remain open until the switch opens again.

**Figure 25: Override Input Wiring**




***Note:***

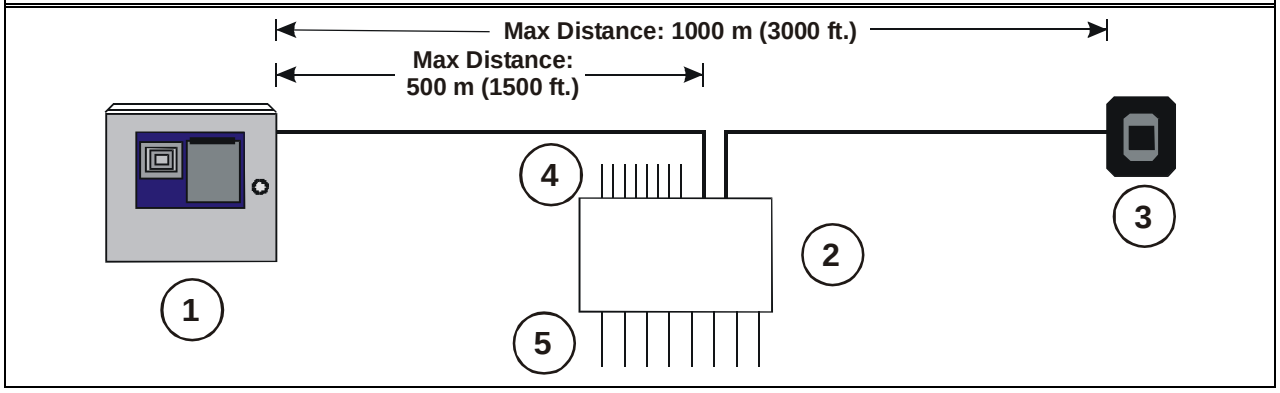
*If it is connected on a master controller, the doors on the master and those on any associated slaves will open and remain open until the switch opens again provided the master override input option has been programmed. For details, refer to Readykey K2200 Series Controllers User Guide (Bosch P/N: 47491, PAC P/N: 17376).*

ANY FAILURE OF THE DOOR CONTROLLER OR CABLING WILL PREVENT THIS MEANS OF RELEASING THE DOORS FROM WORKING. THEREFORE THIS INPUT MUST NOT BE CONSIDERED AS A PRIMARY SAFETY MECHANISM – see *Section 5.4.6 Lock Output* on page 36.

### 5.5.4 Alarm Event Manager

An Alarm Event Manager (AEM) can be connected to the reader channel of any of the door controllers.

**Figure 26: AEM Cable Distances**




*1 - Door Controller*
*2 - Alarm Event Manager*
*3 - Reader*
*4 - 8 Supervised Inputs*
*5 -- 8 Outputs*

#### Inputs

There are 8 supervised inputs available on the AEM.

The detectors may be either Normally Closed or Normally Open. The type of detector is set using the switch bank on the left of the circuit board, below the tamper switch.

For more details, refer to the documentation supplied with the AEM.

### 5.5.5 26-bit Wiegand Readers

Most 26-bit Wiegand readers with open collector D0, D1 can be connected to a Readykey K2200 Series Door Controller as shown in *Figure 27* and *Figure 28*. Note that an interface kit is not required.

**Figure 27: Wiegand Connections – 18 V**

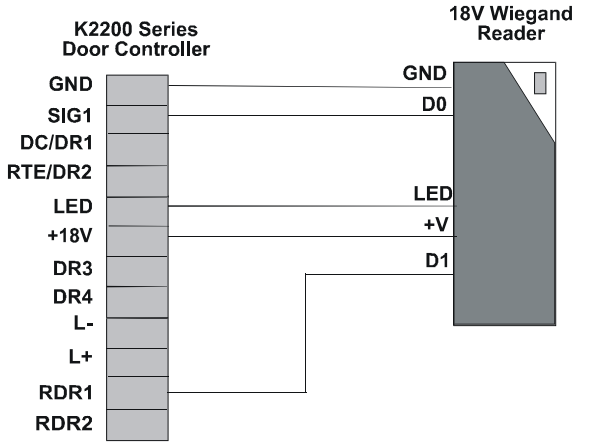
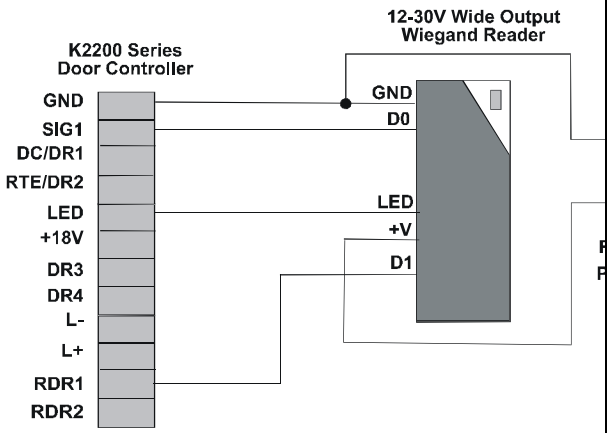



**Figure 28: Wiegan Connections – 12 – 30 V**

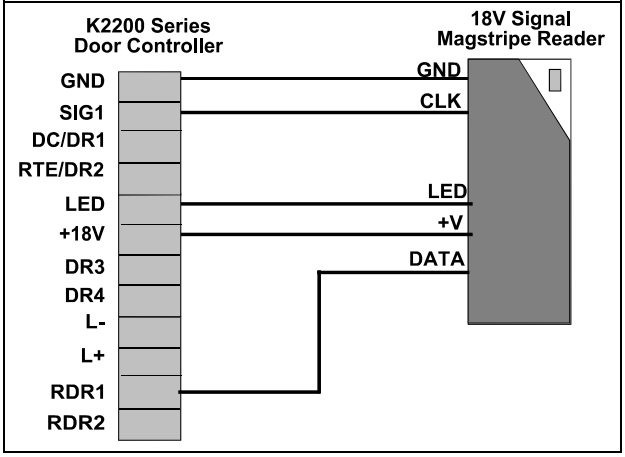



*This is for caption text*

### 5.5.6 Magstripe Readers

Magstripe readers with open collector CLK, DATA can be connected to a Readykey K2200 Series Door Controller as shown in *Figure 29*. Note that an interface kit is **not** required.

**Figure 29: Magstripe Connection**



# 6.0 Configuration and Testing

This section takes you through the various steps needed to configure and test the controllers before connection to the administration system. It contains:

- Basic configuration information
- Details on testing:
  - reader channels
  - locks
  - request to exit switches

***Note:***

*It is assumed that the system will be administered by Readykey for Windows and only the basic configuration needed for this is covered in this section. If you are using the controller as a standalone (administered from the faceplate), see Section 3.2 Faceplate Administration – 16-door.*

## 6.1 Powering Up – First Checks

Before applying power for the first time, loop the case tamper terminals together (**T+** and **T-** at the bottom of the circuit board). This will prevent a ***Case Tamper*** alarm when you switch on.

Leave all readers, locks and any six wire bus or serial port connectors disconnected.

Apply power to the door controller. There should be a short beep. The next response depends on whether the door controller has been programmed before or not.

- If this is a new controller that has not been programmed before, it may beep continuously and display:

  ```
  NO MASTER KEY
  ```

  - If the door controller has been programmed before, it may respond with an alarm indication, such as:

  ```
  DOOR 01 ALARM
  ```

  or

  ```
  CH1 – A-------
  ```

  - If it detects several alarm conditions, the display will show each in turn.
  - If the door controller contains a master key but there are no alarm conditions, the display will remain blank. In which case, check that the door controller has started by pressing ESC key on the keyboard - you should get a beep

Check the faceplate reader by presenting a key to the reader, a ***T*** should appear at the right of the display.

If there is no sound or display, check the faceplate ribbon cable is properly connected.

### 6.1.1 Programming Mode

To get into the programming mode through the faceplate editor mode and issue, you need to perform the engineer's reset as follows:

1. Move DIP Switch 4 to the right. (ON position)
2. You will now see the display:

   ```
   PASSWD _
   ```

3. Type **PAC1990** or **PAC2001**at the keyboard and press [ENT]. (That is a zero at the end, not the letter O).

   ```
   PASSWD _ PAC2001
   ```

4. You will now see the ***CMD*** prompt. (This will time out in 10 seconds of no keys are entered)

   ```
   CMD _
   ```

5. This will take you into Programming Mode and give you the ***CMD*** prompt. You may now issue any valid command.

   If the door controller is being installed for the first time, you should initialize it with the commissioning process. (Commands INIT, K, and SYSTEM START).

### 6.1.2 INIT Command

1. From the ***CMD*** prompt, type in **INIT**, then press the [ENT] button.

   ```
   CMD INIT
   ```

2. You will now see the display:

   ```
   ERASE USR DATA
   ```

3. Press [Y], then press the [ENT] key.

   This message will appear briefly:

   ```
   ERASING USR DATA
   ```

   The process will end and return to the *CMD* prompt.

### 6.1.3 K Command

1. At the ***CMD*** prompt, type in [K], then press the [ENT] button.

   ```
   CMD K
   ```

2. A prompt will appear if the ***PC ADMIN ACTIVE*** prompt in the **INST** command is set to [Y]. If so, press the [ESC] key, type in **INST** at the ***CMD*** prompt and change to [N]. Repeat the **K** command.

   ```
   PC ADMIN ACTIVE
   ```

   Press [Y], then press the [ENT] key.

3. This message will appear briefly:

   ```
   TRANS ERASED
   ```

   The process will end and be back at the ***CMD*** prompt.

### 6.1.4 SYSTEM START Command

1. From the ***CMD*** prompt, type **SYSTEM START** and press [ENT]. (Press [SPC] between **SYSTEM** and **START**).

   ```
   CMD SYSTEM START
   ```

2. This message will appear briefly:

   ```
   ERASE ALL DATA
   ```

   Type [Y] and press the [ENT] key.

3. These two messages are displayed as the memory is cleared.

   ```
   ERASING USE DATA
   ```

   and

   ```
   ERASING SYS DATA
   ```

**End of process.** Proceed to the **INST** Command section.

***Note:***

**The SYSTEM START command will end at the first prompt of the INST command.**

### 6.1.5 INST Command

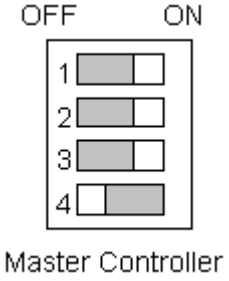
For a Standalone Master Controller (no software used):

#### Option Switches (Standalone Master Controller)

The option switches are fitted at the bottom right of the circuit board.

For a Master Controller, the top 3 switches **must** be set as shown in Figure 30. Switches 1 to 3 should be set to in Figure 30.

**Figure 30: Master Controller DIP Switches**




1. At the ***CMD*** prompt, type in **INST** and press the [ENT] button.

   ```
   CMD INST
   ```

2. At ***PC ADMIN USED***, press [N].

   ```
   PC ADMIN USED     N
   ```

   Press [ENT] to save, press [NXT] to go on.

3. At ***MASTER DC***, press [Y].

   ```
   MASTER DC         Y
   ```

   Press [ENT] to save, press [NXT] to go on.

4. Set the ***POLL*** table for other salve controllers. To poll controller 2, press the **2** and the [ENT] key.

   ```
   POLL              ---
   ```

   Press [ENT] to save, press [NXT] to go on.

5. Present a key to the faceplate reader. Numbers will appear.

   ```
   E0  KEY    00000000
   ```

   Press [ENT] to save, press [NXT] to go on.

6. A password can be set to further protect the Master Key. Type in the password (8 characters max).

   ```
   PASSWORD
   ```

   Press [ENT] to save, press [NXT] to go on.

7. This is an identity for the master key. If you print transactions, this identity will appear against editor operations and alarm acknowledgements. i.e - **MASTER**.

   ```
   ID MASTER
   ```

   Press [ENT] to save, press [NXT] to go on.

8. This allows the entry of a 12-character name when adding keys. Type in **Y**.

   ```
   ALPHA ID          Y
   ```

   Press [ENT] to save, press [NXT] to go on.

9. For the ***PRINTER TYPE***:

   Type **0** if you are using an Epson or IBM compatible p

   Type **1** if the printer is an OKI Microline.

   ```
   PRINTER TYPE      0
   ```

   Press [ENT] to save, press [NXT] to go on.

10. Sets the format in which dates appear in the system:

    Type **0** for 'dd-mm-yy' (European style).

    Type **1** for 'mm-dd-yy' (US style).

    ```
    DATE FORMAT       1
    ```

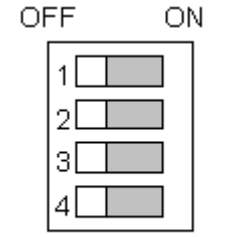
**END OF SETUP**. Press [ESC] to exit back to ***CMD*** prompt.

### Option Switches (For a Slave Controller)

The option switches are fitted at the bottom right of the circuit board.

For a Slave Controller, the top 3 switches **must** be set as shown in Figure 31. Switches 1 to 3 should be set as in Figure 31.

**Figure 31: Slave Controller DIP Switches**




1. At the ***CMD*** prompt, type in **INST** and press the [ENT] button.

   ```
   CMD INST
   ```

2. At ***PC ADMIN USED***, press [N].

   ```
   PC ADMIN USED      N
   ```

   Press [ENT] to save, press [NXT] to go on.

3. At ***MASTER DC***, press [N].

   ```
   MASTER DC          N
   ```

   Press [ENT] to save, press [NXT] to go on.

4. Enter the controller address. 2 - 7 (by default, 1 is the address of the master.

   ```
   ADDRESS            2
   ```

   Press [ENT] to save, press [NXT] to go on.

5. Present a key to the faceplate reader. Numbers will appear. (This should be the same key used on the Master Controller).

   ```
   E0  KEY    00000000
   ```

   Press [ENT] to save, press [NXT] to go on

6. A Password can be set to further protect the Master Key. Type in the password (8 characters max).

   ```
   PASSWORD
   ```

   Press [ENT] to save, press [NXT] to go on.

7. This is an identity for the master key. i.e.- **MASTER**.

   ```
   ID MASTER
   ```

   Press [ENT] to save, press [NXT] to go on.

8. This allows the entry of a 12-character name when adding keys. Press [Y].

   ```
   ALPHA ID           Y
   ```

   Press [ENT] to save, press [NXT] to go on.

9. At PRINTER TYPE:

   Type **0** if you are fitting an Epson or IBM compatible.

   Type **1** if the printer is an OKI Data Microline.

   ```
   PRINTER TYPE       0
   ```

   Press [ENT] to save, press [NXT] to go on.

10. At DATE FORMAT:

    Type **0** for 'dd-mm-yy' (European style).

    Type **1** for 'mm-dd-yy' (US style).

    ```
    DATE FORMAT        1
    ```

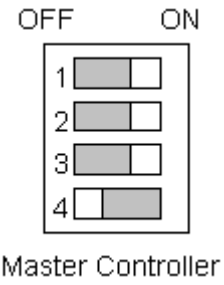
**END OF SETUP**. Press [ESC] to exit back to ***CMD***

### Option Switches (For a Master Controller with Admin Kit and software)

The option switches are fitted at the bottom right of the circuit board.

For a Master Controller, the top 3 switches must be set as shown in Figure 32. Switches 1 to 3 should be set as in Figure 32.

**Figure 32: Master Controller (with Admin Kit and software) DIP Switches**




1. At the ***CMD*** prompt, type in **INST** and press the [ENT] button.

   ```
   CMD INST
   ```

2. At ***PC ADMIN USED***, press [Y].

   ```
   PC ADMIN USED      Y
   ```

   Press [ENT] to save, press [NXT] to go on.

3. At ***MASTER DC***, press [Y].

   ```
   MASTER DC          Y
   ```

**END OF SETUP.** Press [ESC] to exit back to ***CMD*** prompt. (Nothing else needs to be configured).

### 6.1.6 Test Mode

The test mode allows the system to have a "functional" test performed, without any programming. It is advised that each door channel be tested to ensure proper operation of the reader, the door contact and the request to exit devices.

1. From the ***CMD*** prompt, type in [S], then press [ENT].

```
CMD S
```

2. By pressing [NXT] key you will display the channel input status for all 4 doors. You can use - (minus) to go back through each door. Refer to the table below for further details.

```
1= DC    RT       1
```

Channel 1 status. Press [NXT] to go to channel 2.

```
2= DC    RT       1
```

Channel 2 status. Press [NXT] to go to channel 3.

```
3= DC    RT       1
```

Channel 3 status. Press [NXT] to go to channel 4.

```
4= DC    RT       1
```

Press [NXT] to continue.

**Table 19: Input Physical State Codes**

| | |
|---|---|
| # | Indicates the Channel Number |
| DC | Displays when the door contact circuit (DR1) is closed. |
| RT | Displays when the Request to Exit device (DR2) is activated. |
| 1(2) | Displays when a key/card is presented to a reader. (2 will display when key/card presented to an EXIT reader). |

3. This shows you how many events are currently in the High Priority (HI) list and how many in the Low Priority (LO) list

```
TRAN HI00   L00000
```

Press [NXT] to continue.

4. This show you the status of the controllers. Refer to the table below for further details.

```
CTS OVRD TAMP  @
```

**Table 20: Display Status**

| | |
|---|---|
| CTS | if CTS displays, the serial port CTS signal is high. |
| OVRD | If OVRD displays, the terminals F+ and F- are closed, emergency override active. |
| TAMP | If TAMP displays, the terminals T+ and T- are closed, case tamper active. |
| @ | this character represents the last command received from the PC or CNC. You may see ? or / at times. |

**End of section**. Press [ESC] to exit to the ***CMD*** prompt.

### 6.1.7 Setting the Modem Connection

1. From the ***CMD*** prompt, type [M] and press [ENT].

   ```
   CMD_M
   ```

2. Enter to appropriate Baud Rate. Available baud rate settings are 300, 600, 1200, 2400, 4800, 9600, 19200.

   ```
   BAUD RATE      1200
   ```

   Depending on the system type the baud rate should be:

   - Printer attached to faceplate administered controller (system type 0) : 4800
   - Door controller attached to PC interface kit (system type 1) : 9600
   - Door controller attached to Readykey for Windows (system type 2): 9600
   - Door controller attached to Readykey Multi-Site CNC (system type 2 or system type 3): the baud rate depends on RS-232 devices being used, modems, line drivers, etc. 300, 600, 1200, 2400, 4800, 9600, 19200.

   Press [ENT] to save, press [NXT] to go on.

3. This setting is important as it will ensure that a dial-up modem is correctly programmed to auto-answer. It is also important to ensure that if no modem is connected, this entry is set to [N].

   ```
   CONNECT MODEM     N
   ```

***Note:***

*Applicable only if a dial-up modem is connected to the controller*

***N****= There is no dial-up modem connected to the door controller.*

***Y****= Enter Y if there is a dial-up modem connected to this door controller.*

Press [ENT] to save, press [NXT] to go on.

4. To select these options, enter the required numbers (1 to 7) followed by [ENT] to accept the selection.

   ```
   SETUP          RDPHBTX
   ```

   For example, entering `1, 2, 5` and `7` selects those options and displays `RD--B-X` to show the options selected. (See Table 21)

**Table 21: Setup Options**

| | |
|---|---|
| R | When administered by Readykey for Windows only.<br>This indicates whether Remote Acknowledgement is required for alarms. In this case, if R is showing, a door alarm will only be cleared at the door controller if it is acknowledged by an operator at the administration system. This may be the faceplate or a PC. If R is not showing, the alarm will be acknowledged at the door controller when it is passed to the master controller. This is important if you use the programmable on-board relays (Readykey for Windows systems only). These relays and those on any attached alarm module will only be reset when the alarm is accepted by an operator. |
| D | For use with Multi-Site CNC only. Dialback. In the event of an alarm condition or Access Authorized (if set up) the door controller will dial-back to the Multi-Site CNC using the first number shown in Dialback specification in this section. If it fails to get through, it will attempt again on the first number. If it fails again, it will try the second number, if present, twice. This process will be repeated 5 times. If there is still no success it will give up, generating a Comms Failed transaction |
| P | For use with Multi-Site CNC only. Comms Protection.<br>This setting activates the Comms protection facility.<br>See the Protect Comms specification in this section |
| H | For use with Multi-Site CNC only.<br>Hardware Handshake. Set this if the device being used to communicate with the CNC requires a hardware handshake (CTS/DTR). The door controller will not send, or stop sending, data when its CTS input is low. |
| B | For use with Multi-Site CNC only.<br>Auto Baud Rate Select. When a modem obtains a connection, it returns a message stating the baud rate at which it will communicate. This rate is usually 'negotiated' between modems when a line is established. When this option is selected, the door controller will adjust its serial baud rate to match the line speed |
| T | Transaction Restriction. Use this setting only when installing the Readykey K2200 Series Controller on a system such as a Readykey 6000 or Readykey K2000AM, which does not recognize transaction types such as Power On, Power Off, Auto Relay Set etc . |
| X | Not used. |

***Note:***

*It is recommended that the dial-back times are set using Readykey for Windows.*

5. Telephone number 1 for dial-back.

   Press [ENT] to save, press [NXT] to go on

6. Telephone number 2 for dial-back.

   Press [ENT] to save, press [NXT] to go on..

7. For this feature to operate, P must be specified for Setup - Remote Acknowledge, Dialback and Comms Protection.

   ```
   PROTECT COMMS  N
   ```

   This feature allows dial-up communications to be established only when the master keycode sent by the CNC matches the master keycode stored in the door controller.

   Type [N] to allow the next dial-up to be accepted. The next master key that is sent by the CNC will be accepted by the door controller and stored. All future dial-ups must have a match between this code and the one sent by the CNC.

   Press [ENT] to save, press [NXT] to go on.

8. Up to 16 Hayes-compatible modem control characters can be entered here.

   You should only need to use these if the modem connected requires more than the standard programming provided by default. ***Do not put any characters in here unless instructed to do so by Bosch Technical Support.***

   To enter characters not provided on the keypad, you can use the [•] key, followed by the following letters:

**Table 22: Key Combinations to obtain keys not on keypad**

| [•] key + | Result |
|---|---|
| A | & |
| P | % |
| B | \ |
| D | $ |
| Q | ? |
| E | = |
| S | * |

**End of setup**. Press [ESC] to return to **CMD** prompt.

### 6.1.8 Event Mode

Five options are provided which can prevent certain types of transaction being sent by the door controller to the administration system. This can be useful in a busy system to speed up the communication of more important events, or on dial-up systems to keep connect times short.

1. From the ***CMD*** prompt, type [T] then press [ENT].

   ```
   CMD_T
   ```

2. This allows programming of `Request to Exit, Request for Entry` event filtering. Type **Y** and [ENT] to ignore these events.

   ```
   FRGT RTR      N
   ```

   Press [ENT] to save, press [NXT] go on.

3. This allows programming of `Free Exit` event filtering. Type **Y** and [ENT] to ignore these events.

   ```
   FRGT FREE EXIT N
   ```

   Press [ENT] to save, press [NXT] go on.

4. This allows programming of filtering of events generated by time profiles. These are all "automatic/auto" events, e.g. Automatic Lock and Auto Zone Disable. Type [Y] and [ENT] to ignore these events.

   ```
   FRGT TIME EVNT N
   ```

   Press [ENT] to save, press [NXT] go on.

5. This allows programming of "allowed" or positive events - `Access Authorized, Entry Authorized, Exit out of Hours` and `Exit Authorized`. Type **Y** and [ENT] to ignore these events.

   ```
   FRGT POS TRANS N
   ```

   Press [ENT] to save, press [NXT] to go on.

6. This allows programming of all events where access is denied (negative events - `No Access : 'reason'` events. .

   Type [Y] and [ENT] to ignore these events.

   ```
   FRGT NEG TRANS N
   ```

   Press [ENT] to save, press [NXT] go on.

7. This allows programming of positive transaction dial-back for door controller 1 (i.e. the door controller connected directly to the modem).

   ```
   DIAL D/C1 DR----
   ```

   Type the door number (reader channel number) for which you wish dial-back to be initiated in the case of a positive event occurring followed by [ENT].

For example, if you want a dial-back to be initiated when a positive event occurs on doors 1 and 3 on door controller 1, type **1** and **3** and press [ENT].

Press [ENT] to save, press [NXT] go on.

8. This allows programming of positive event dial-back for door controller 2 (i.e. the controller with address 2)

```
DIAL D/C2 DR----
```

Programming is identical to that for door controller 1.

Press [ENT] to save, press [NXT] go on.

9. This allows programming of positive event dial-back for door controller 3

```
DIAL D/C3 DR----
```

Programming is identical to that for door controller 1.

Press [ENT] to save, press [NXT] go on.

10. This allows programming of positive event dial-back for door controller 4

```
DIAL D/C4 DR----
```

Programming is identical to door controller 1.

Press [ENT] to save, press [NXT] go on.

11. This allows programming of positive event dial-back for door controller 5

```
DIAL D/C5 DR----
```

Programming is identical for door controller 1.

Press [ENT] to save, press [NXT] go on.

12. This allows programming of positive event dial-back for door controller 6

```
DIAL D/C6 DR----
```

Programming is identical for door controller 1.

Press [ENT] to save, press [NXT] go on.

13. This allows programming of positive event dial-back for door controller 7

```
DIAL D/C7 DR----
```

Programming is identical for door controller 1.

Press [ENT] to save, press [NXT] go on.

14. This allows programming of positive event dial-back for door controller 8.

```
DIAL D/C8 DR----
```

Programming is identical for door controller 1.

Press [ENT] to save, press [NXT] go on.

***Note:***

*In order for dial-back on positive events to operate a number of other settings need to be programmed.*

*In **Setting** mode, the following must be programmed:*

```
CONNECT MODEM  Y
```

*Make sure that **Y** is programmed to indicate there is a dial-up modem connected to this door controller.*

```
SETUP -D------
```

*Make sure that the **D** setting is programmed here to enable **Dialback**. In the event of an alarm condition, the door controller will dial-back to the Multi-Site CNC. If a dial-back on positive transactions is also required, the additional settings described above must also be programmed.*

*In **EVENT** mode, the following must be programmed:*

```
FRGT POS TRANS N
```

*This setting must be programmed to **N** in order that all positive transactions are not ignored, and hence initiate dial-back to the CNC.*

### 6.1.9 Programming Readers and Locks (For Standalone Masters only, no software)

Having verified the operation of the readers and door inputs, now you can verify the lock operation. To do this you will need to program some values against each door.

***Note:***

*As these will be required when the system is operational, it is sensible to use the correct information for each door.*

Get to the CMD prompt by presenting the **master** key to the internal reader on the controller faceplate.

#### The D Command

This command allows settings to be made for each door. You can use the up and down arrow keys to move between doors (the door number DR n will change). Use the [NXT] and - (minus) keys to move between settings.

1. At the ***CMD*** prompt, type [D] and press [ENT].

```
CMD D
```

If you get an ***PC ADMIN ACTIVE*** message, you will need to change ***PC ADMIN ACTIVE*** to [N] to continue.

2. This is the number of seconds for which the lock will operate. Type the required number of seconds for the Door 1, Lock Release Time . (0-255 seconds).

```
DR 1          LRT 5
```

Press [ENT] to save, [NXT] to go on.

3. Type the required number of seconds for the Door 1, Door Open Time. (0-255 seconds).

```
DR 1          DOT   0
```

This is the amount of time, in seconds, after the lock release time has expired, at which a door left open warning will be given.

This value also indicates whether a door contact is fitted or not. If you set this value to 0 the door controller will **not** monitor the door contact.

Press [ENT] to save, press [NXT] to go on.

4. You may use a time profile to automatically open and close the door. Leave this value at `0` (no automatic control).

***Note:***

***This requires that the Time Profiles be setup previous to this step.***

```
DR 1          TP     0
```

Press [ENT] to save, press [NXT] to go on.

**Door 1, Lock Mode (Options)**

This display consists of 8 settings represented either by a number or a - (dash). Each setting is changed by pressing the number for the option. (See the table below). When set, the number will appear; when not set, a - (dash) will replace the number. At start up all settings will be off.

```
DR 1  M  --------
```

Press [ENT] to save, press [NXT] to go on.

**Table 23: Lock Mode Settings**

| | |
|---|---|
| 1 | Set: Fail-safe (default). The locks will be continuously powered, power removed to unlock the door.<br>Unset: Fail-secure. Power will be supplied to unlock the door. |
| 2 | See *Section 5.4.5 Emergency Override/Free Exit* on page 35.<br>Set: Door contacts (DR1) produce a Free Exit report.<br>Request to Exit (DR2) produces Emergency Override On when pressed, Emergency Override Off when released.<br>Unset: Door contacts operate normally. Request to Exit operates normally. |
| 3 | Set: RTE produces Request for Entry report.<br>Unset: RTE produces Request to Exit report. |
| 4 | Set: AVR reader attached.<br>Unset: AVR not attached. |
| 5 | Set: Readykey Alarm Module/AEM attached.<br>Unset: No Alarm Module/AEM |
| 6 | Exit out of hours. This allows personnel with access controlled by a time profile to use their keys outside the time profile if they are leaving through an exit door.<br>Set: Exit out of hours allowed.<br>Unset: Not allowed. |
| 7 | Set: Readykey PIN reader with time profiles attached.<br>Unset: No Readykey PIN reader with time profiles |
| 8 | This is a special setting that is used in combination with option 2. Leave this Unset unless specifically required.<br>Set: DR1 input will operate the lock output and generate a Request to Exit transaction.<br>Unset: DR1 does not operate the lock, if used as a door contact it will generate a Free Exit transaction |

**Lock Mode 2 (Options)**

This display consists of a further 8 settings represented either by a number or a - (dash). Each setting is changed by pressing the number for the option. (See the table below). When set, the number will appear; when not set, a - (dash) will replace the number. At startup all settings will be off..

```
DR 1  M2 --------
```

Press [ENT] to save, press [NXT] to go on.

**Table 24: Lock Mode 2 Settings**

| | |
|---|---|
| 1 | Set: RTE with no lock output. This is designed to be used on the secure side of a door where exit is via a handle, etc. Pressing the Request to Exit switch informs the access system that someone has left the area.<br>Unset: RTE with Lock Output. This is the default setting. When the Request to Exit switch is pressed the lock is de-activated and the door can be opened. |
| 2 | Set: Early lock release time. When set the lock is de-activated a maximum of two seconds after the door is opened.<br>Unset: Lock release time operates normally.<br>Lock is de-activated when the lock release time expires or the door closes |
| 3 | Set: Log authorized event only when door opened. When set, any authorized event is only reported if the door is opened.<br>Unset: All events are logged whether or not the door is opened. |
| 4 | Elevator Control. This option is not user configurable and is set using Readykey for Windows. |
| 5 – 8 | These settings are not currently used. |

### Door Identity

You may enter the name of the door here. This is what will appear on reports if the system is administered from the faceplate.

```
ID _
```

Type a door name (any characters or numbers, up to a maximum of 12).

Press [ENT] to save, press [NXT] to go on.

### PIN Reader Time Profile

**Note:**

*Skip unless a PIN reader is being used*

If no time profile is entered (0 = no time profile), a key **and** PIN must be used at all times.

```
DR 1        PINTP    0
```

If a time profile is specified within the specified time, a key can be used without a PIN. Outside the specified time **both** the key and PIN are required.

**End of process**. Press the [ESC] key to go back to the ***CMD*** prompt.

Repeat the above for all 4 doors on the door controller. To change to another door, use the **up** and **down** arrow keys.

### The DC Command

This command allows you to set up lock sharing (two readers operate the same lock) and anti passback, if required.

This command allows settings to be made for each door controller. You can use the up and down arrow keys to move between controllers (the door controller number D/C n will change). Use the [NXT] and - (minus) keys to move between settings.

1. At the ***CMD*** prompt, type [D][C] and press [ENT].

```
CMD DC
```

### Passback Door Controller 1

1. To set up passback control using door 1 as an entry reader and door 4 as an exit reader press 1.
2. To set up passback control using door 2 as an entry reader and door 3 as an exit reader press 2.
3. To set pass back on exit press 3.

```
PBC D/C 1        ---
```

4. Press [ENT] to save changes and [NXT] to go on.

### Passback Time-out Door Controller 1

0-70 minutes. (10 minute minimum, increments of 5 minutes).

This value sets a time after which pass back is cancelled. This may be useful when personnel may leave without presenting their key. After so many minutes they will be allowed access again.

```
PB-TIM   D/C  1   0
```

Press [ENT] to save changes and [NXT] to go on.

### Lock Sharing Door Controller 1

This is used to define which readers operate which locks when lock sharing.

- Lock output 1 is operated by both readers 1 and 4.
- Lock output 2 is operated by both readers 2 and 3.

Press [ENT] to save and press [NXT] to go on.

```
RDR-LK  D/C  1   --
```

**End of process**. Press the [ESC] key to go back to the ***CMD*** prompt.

### The C Command - Setting the System Time

1. At the ***CMD*** prompt, type in [C] and press the [ENT] key.

```
CMD C
```

2. Enter in the current date. (MM-DD-YY)

```
DATE        05-27-03
```

   Press [ENT] to save and [NXT] to go on.

3. Enter in the current time. (HH-MM).

```
ENTER TIME     15-53
```

Press [ENT] to save.

**End of process**. Press [ESC] to go back to the ***CMD*** prompt.

#### The DL Command

The **Download** (**DL**) command sends the contents of the master controller's database to all slave controllers. This will ensure that all the door controllers have the same information. (The slave controllers need to be configured and address properly in order for this command to function).

1. At the ***CMD*** prompt, type [D][L] and press [ENT]**.**

```
CMD DL
```

2. Type [Y] and press [ENT] to confirm.

```
DLOAD TO ALL          Y
```

3. From the ***CMD*** prompt, press the ESC key to exit out of programming.

```
CMD_
```

4. You will see this message on the screen when you leave programming mode.

```
SENDING DATA
```

It indicates the progress of the download, in this example 26.9%. The download will be complete when it reaches 100%. The message will disappear when the download is completed.

```
DOWNLOAD   26-9
```

### 6.1.10 Testing Readers and Locks

If you programmed a master programming key in the INST command, that key will have access through all doors. You can now use this key to check the operation of readers and locks.

#### Readers

1. Present the key to each reader:
2. The green LED should light on the reader and remain on for the duration of the lock release time.
3. The lock should operate for the duration of the lock release time.
4. The faceplate should display the following (the numbers indicating which doors are open):

```
DOORS OPEN    1
```

#### Door Monitoring

If door monitoring is being used:

1. Close the door before the lock release time expires, the green LED on the reader should go out and the door should lock.
2. Leave the door open after a valid card read, the green LED on the reader will go out and the lock will lock. After the expiry of the door open time, you should get a door left open warning:

```
CH 1 - 0  --------
```

3. Open the door without presenting a key or tripping the request to exit device. You should immediately obtain a door alarm, flashing and sounding, indicating which door has been forced:

```
DOOR 01 ALARM
```

4. You should get exactly the same effect by disconnecting the reader terminal block - causing a tamper alarm.

***Note:***

*To silence the faceplate, present the Master programming key to the faceplate reader*

## 6.2 RS-232 Serial Port

The RS-232 serial port can be used to connect the door controller to a variety of devices.

***Note:***

*The printer connector is not currently used. The printer is connected via the RS-232 connector.*

### 6.2.1 Connecting a Printer

***Faceplate:***

*A printer can only be fitted when the system is being administered from the faceplate. When administered from a PC, all printed output is generated by the PC.*

#### Report Printing

All the information stored in the door controller database can be printed. There are several printer commands, **P1** to **P9**, see *Readykey K2200 Series Controllers User Guide* (Bosch P/N: 47491, PAC P/N: 17376), which will allow particular reports to be generated.

#### Transaction Printing

The door controller can store about 2400 transactions in its memory. Each transaction is printed out if a printer is connected. If the printer is not connected, the transactions will be stored. Once the maximum number of transactions is reached, the oldest ones will be lost. When the printer is reconnected, printing will continue with the oldest unprinted transaction and continue until all unprinted transactions have been output.

#### Printer Specification

An 80-column dot matrix printer with a **serial** interface is required. The serial interface must be set, using switches and/or jumpers with the following parameters:

- 4800 baud
- 8 data bits, 2 stop bits
- No parity
- Hardware handshake using DTR/CTS. When the printer is busy, it should force DTR, usually pin 20, low.
- The printer must be capable of receiving at least 82 characters after a busy signal is sent (DTR going low).

Readykey have used the EPSON LX series and the OKI Data Microline 182 printers successfully in the past.

#### Baud Rate

You must make sure that the baud rate at the master door controller is set to 4800. See the **INST** command (see *Section 6.1.5 INST Command*).

#### Printer Cable

The following cable is required:

Use 24 AWG (0.5 mm), 4-conductor, unshielded cable, maximum length: 50 ft. (15 m)

**Figure 33: Printer Cable Pin-outs**

| Readykey K2200 | | Printer | |
|---|---|---|---|
| 5-pole terminal block | | 25-pin male D-type connector | |
| TXD | ——— | 3 | RX |
| CTS | ——— | 20 | DTR |
| RXD | | | |
| DTR | | | |
| GND | ——— | 7 | Signal Ground |

#### Testing the Printer

Once the printer is connected and the parameters set as above, switch on the printer and make sure that it is 'on-line'. If everything is set correctly, you should immediately get some transactions printed out. If not, pres the reset button on the controller.

#### Possible Problems

If you do not get immediate printing of events, check the following:

- Check the cable - it should be wired as described above.
- Check that the printer's serial port is being used. Most printers are sold with a parallel port as standard - the serial port is supplied as an add-on option. There may be a switch that selects which port the printer should use.
- Check that both the door controller and the printer are set to a baud rate of 4800. If you get random characters on the printer, the baud rates may not match. The printer will usually have DIP switches or jumpers that need to be set to give the correct baud rate. Always switch off the printer before you change any settings.
- If you get normal printout but after one or two pages the lines break up or you get random characters, the 'handshaking' may not be working. Check that the printer is using pin 20 for its DTR signal. Some printers allow you to select a different pin number (often pin 11).

### 6.2.2 PC Interface Kit

#### Description

***Readykey for Windows 16/32:***

*When an access control system is administered from a PC, a PC interface kit is used to connect the PC to the door controller. This involves connecting an interface unit to the PC, along with a desktop key reader, and connecting this, via a 4-conductor cable, to a small line driver unit plugged into the door controller.*

*See the installation documentation for each administration system for connecting the interface unit to the PC and establishing communications.*

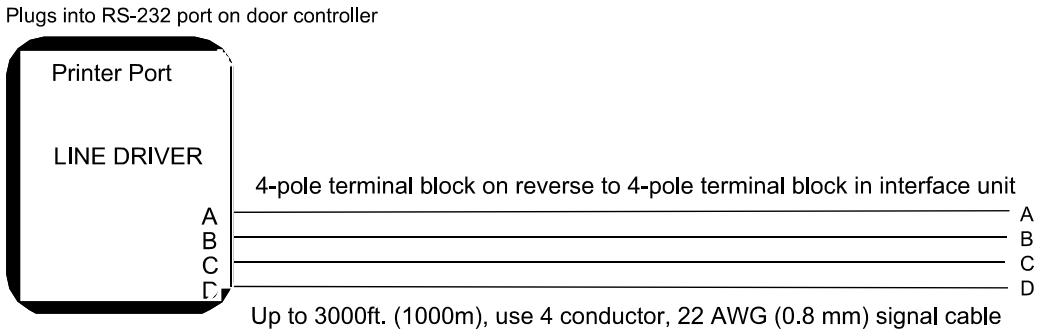
*This section describes the installation of the line driver at the door controller.*

*You **cannot** use any other type of communications devices such as line drivers, dial-up modems, etc*

#### Cable Specification

Use multi-stranded, unshielded, 4-conductor 24 AWG (0.5 mm) signal cable.

**Figure 34: Line Driver Wiring Diagram**




### Fitting the Line Driver

For effective communications, you must ensure that both the interface unit and the door controller are properly grounded.

The line driver should be plugged directly into the door controller's RS-232 port, the 5-way socket at the bottom right of the circuit board.

The connection to the interface unit is made by connecting the terminals labeled A B C D to the corresponding terminals in the interface unit. Use the 4-pin terminal blocks provided.

If communications are successfully established, you should a polling indication:

*1*

The 1 at the far right of the display means the PC system is communicating with the door controller. From now on:

- All updates must be made from the PC.
- All transactions, including alarms, are sent to the PC.

### 6.2.3 Connecting a Modem

Multi-Site CNC See *Readykey K6100 Central Network Controller Installation Guide* (Bosch P/N: 46512, PAC P/N: 17163) for details of communicating with a door controller over public (PSTN) phone lines, the types of modems you can use and door controller configuration.

The modem should be installed close to the door controller and connected using the cable described in *Figure 35*.

### Modem to Readykey K2200 Series Cable

Use 24 AWG (0.5 mm), 6-conductor, unshielded cable, maximum length: 50 ft. (15 m).

**Figure 35: Modem to Readykey K2200 Series Cable**

| Modem | | | Door Controller |
|---|---|---|---|
| ɔin male D-type connector | | | 5-pole terminal block |
| TX | 2 | - - - - - - | TX |
| RX | 3 | - - - - - - | RX |
| GND | 7 | - - - - - - | GND |
| CTS | 5 | - - - - - - | CTS |
| RTS | 4 | | |
| DTR | 20 | | DTR |

*Pin 4 and 20 are twisted together and connected to the DTR terminal at the controller.*

# 7.0 Troubleshooting

This section is designed to help you establish if a fault exists within a door controller or not. To do this efficiently, we recommend that you are equipped with the following:

- A multi-meter capable of reading volts (0-300 VAC, 0-30 VDC), amps (0-3 A) and ohms.
- A Readykey reader on a flying lead that can be plugged into a reader channel, this should also have buttons emulating a door contact (DR1-GND, normally closed) and the Request to Exit switch (DR2-Gnd, normally open).
- The usual collection of hand-tools, screwdrivers, wire strippers and cutters, etc.
- Replacement fuses.

## 7.1 Door Controllers and Readers

### 7.1.1 The controller appears to be dead

1. Before performing any of the following checks, remove any batteries and disconnect all readers, lock outputs, serial connections and six-wire bus, where fitted.
2. Check the heartbeat LEDs located on the bottom left of the circuit board. If the green LED is flashing, it indicates that the controller is healthy. If the red LED flashes, this indicates that communications is occurring.
3. Press the **?** key on the keypad. If the door controller is operating correctly, there should be a beep and the software version should be displayed on the screen. If there is no reaction, check the ribbon cable between the faceplate and the main circuit board is properly connected.
4. Check the AC power supply. This should be between 85 and 250.
5. Check the power supply fuse. This is found in a pull-out drawer just below the AC cable socket. Replace with a 2 A, 20 mm fast-blow fuse. (Only in the 4 A power supply).
   - Check the battery output voltage at the battery terminals, this should be 13.8 VDC **or** 27.6 VDC depending on the lock output voltage.
   - Check the power supply outputs. These are indicated on the circuit board next to the 8-pole connector, CN7.
   - +V and -V (six wire bus supply) **12 VDC**
   - Blue GND and +5 V (logic supply) **5 VDC**
   - Black GND and +18 V (reader supply) **18 VDC**
   - Black GND and BAT+ (battery supply) **13.8 VDC** or **27.6 VDC**
   - Black GND and +12 V (lock output supply) **12 VDC** or **24 VDC**
   - If the door controller fails on any of the above checks, the power supply is probably at fault, arrange for a replacement with your supplier.
   - If the door controller passes all the above tests, test each reader and lock output in turn, as described in the next section.

### 7.1.2 One or more readers or locks fail to operate

Before carrying out the following tests, disconnect **all** the readers and lock outputs. Refer to the Engineering Mode: Testing (see *Section 6.1.6 Test Mode*), this contains details on how to check reader operation.
Each reader channel should be tested in turn.

### 7.1.3 Checking the Reader

1. With no reader connected, check the voltage between GND and +18 V. This should be at least 18 **VDC**.
2. Reconnect the reader. Check the voltage at the reader. This should be above 10.5 **VDC**. If not, check the gauge is correct for the cable distance from the controller (see *Reader Cabling*).
3. Check the reader operation by presenting a key, if the door controller is in Engineering Mode (see *Section 6.1.6 Test Mode*), a 1 or 2 should appear on the display while the key is being read by the reader.
4. If no key is read, disconnect the reader and connect a known working reader and repeat step 3.
5. If the working reader operates correctly, suspect a faulty reader, or wiring between the door controller and reader. Go to step 8 to check the wiring and reader.
6. If the working reader does not operate, suspect a faulty reader channel on the door controller.

7. Connect the reader to another channel, if the reader now operates, the original channel is faulty. Arrange for the door controller to be repaired. Go to step 10.
8. Disconnect the suspect reader. Disconnect the reader connector at the door controller. Check the cable for short circuits between all conductors, and all conductors and ground.
9. If the cable is to the correct gauge and free from short circuits, connect the known working reader in place of the suspect reader. If this reader operates, the original is faulty. Arrange for a replacement with your supplier.
10. Repeat for all four (two on a Readykey K2200) reader channels.

### 7.1.4 Checking the Lock Output

If all the reader channels are shown to operate correctly, you should check the lock outputs. You should know whether the lock is fail-safe (power is removed to operate the device) or fail-secure (power is applied to operate the device. You should also know whether the door controller has been set to provide 12 **VDC** or 24 **VDC**. If interlock has been set on a pair of readers, channels 1 and 4 will operate lock output 1, and channels 2 and 3 will operate lock output 2.

1. For each lock output:

   Make sure that the door secure, that is, the door controller display should not indicate that the door is open.

   Make sure a lock release time has been set, it should be at least 5 seconds to allow measurements to be reliably made.

   Establish whether lock sharing has been set.
2. Check the voltage at the lock output (**L-**, **L+**) on the controller. This should be **12 VDC** or **24 VDC** if the lock is **fail-safe**, or less than **0.5 VDC** if it is **fail-secure**. (The Readykey K2200 series has solid state lock outputs, these will not show exactly 0 volts when off).
3. Operate the lock, operate the RTE or short the DR2 reader input to GND. The lock output should operate. Check the voltage at the lock output. This should now show the reverse of the previous measurement, i.e. less than **0.5 VDC** for **fail-safe**, **12 VDC** or **24 VDC** for **fail-secure**. If not, suspect the lock output to be faulty.
4. Repeat steps 2 and 3 above but this time measure the voltage **at the lock**. The lock should receive the minimum voltage required for it to operate (see the lock manufacturer's specifications). If the voltage is too low at the lock, the lock supply cable gauge may be too small for the distance from the controller.
5. Disconnect the cable from the lock. Check the cable for short circuits between the conductors, and between the conductors and ground.
6. Ensure there is a Metal-Oxide Varistor (MOV) fitted across the lock terminals. If large currents are used (i.e. >1 A) use the large MOV supplied with the door controller. If small currents are used (i.e. <1 A) use the small MOV supplied with the reader. Reconnect the lock.
7. Check the current drawn by the lock. This should not exceed 2.0 A (12 **VDC**) or 1.0 A (24 **VDC**). If it significantly exceeds the nominal current specified by the manufacturer, the lock may be faulty.
8. If the lock still fails to operate when the door controller is switching the correct voltage, suspect a faulty lock. Try fitting a known working lock in place of the suspect device.
9. Repeat for all four (two on a Readykey K1200) lock outputs.

   D/C n ERROR-1 (where n is 2 - 8).

   This means the master is trying to communicate with a slave controller that has been entered in the poll table, but is getting no reply.
10. Check:

    The six-wire bus connection between the master and slave.

    Check the option switches (bottom left of door controller circuit board) are set correctly. The top three switches should be to the right on the master, to the left on a slave.

    Check the address of the slave, it should be set to 2, 3 or 4. Make sure no other slaves have the same address.

    Disconnect any other slaves on the six-wire bus. If the fault goes away, check the connections and addresses of the other slaves.

### 7.1.5 No error is displayed on the master but the slave still fails to communicate

This probably means that the slave door controller is not in the master's poll table.

Check:

The poll table should include the slave controller number (2-8). Use the INST command (see Section see *Section 6.1.2 INIT Command*) to check the poll table.

# 8.0 Transactions

The following pages show all the transactions generated by a door controller. Other types of transaction may be generated by other parts of the system, such as the PC, a CNC, etc.

## 8.1 High Priority Transactions

These transactions are always sent to the printer or administration system before any other transactions.

**Table 25: High Priority Transactions**

| | |
|---|---|
| Emergency Override Off | Alarm Acknowledged |
| Emergency Override On | Override Alarm Accepted |
| Unauthorized Access | RTE Button Held Down |
| No Access: Level | Repeated Key Use |
| No Access: Locked Out | PIN Reader Duress |
| No Access: Time | Local Duress Alarm Acpt |
| No Entry: Passback | No Exit: Passback |
| No Access: Holiday | Power Off |
| Door Left Open | Power On |
| Door Closed | Incorrect PIN Entry |
| Anti-Tamper Alarm | Zone Tamper Alarm |
| Alarm Cleared | Zone Trouble Alarm |
| Override Alarm | Zone Restored & disarmed |
| Override Alarm Reset | Zone Tamper Accepted |
| Manual Lock | Zone Trouble Accepted |
| Manual Unlock | Zone Tamper Cleared |
| Alarm Zone Active | Zone Trouble Cleared |
| Zone Restored & ReArmed | Lock Power Override |
| Local Alarm Accepted | Lock Power Normal |
| No Access: Visit Time | |

## 8.2 Dial Back Transactions

These transactions will cause a door controller to dial back to a Multi-Site CNC.

**Table 26: Dial Back Transactions**

| |
|---|
| Unauthorized Access |
| Anti-Tamper Alarm |
| Override Alarm |
| Alarm Zone Active |
| PIN Reader Duress |
| Power Off |
| Zone Tamper Alarm |
| Zone Trouble Alarm |

In addition, the following transactions will result in dial-back if they are programmed to do so:

- Exit Authorized
- Entry Authorized
- Access Authorized

## 8.3 'Forget' Transactions

The door controller will, if required, **not** send certain groups of transactions. You can choose which of the following groups are not sent.

### 8.3.1 Request to Exit

These transactions may form 40-50% of all the transactions in a system. By allowing the door controller to 'forget' these events, the throughput of more significant transactions can be improved.

- Request to Exit
- Request for Entry
- Free Exit
- Free Exit
- Timed Events

These are reports of events that happen automatically as a result of a time profile being applied.

- Automatic Lock
- Automatic Unlock
- Auto Zone Disable

- Auto Zone Enable
- Auto Relay Reset
- Auto Relay Set

### 8.3.2 Positive Transactions

These are records of normal key usage. By allowing the door controller to 'forget' these events, throughput may be considerably improved.

***Note:***

*Some administration system functions such as presence in area, muster mode, current user, etc. along with other functions that rely on detecting the movement of personnel, will not work if these events are not sent.*

*Exit Authorized*

*Entry Authorized*

*Access Authorized*

*Exit Out of Hours*

### 8.3.3 Negative Transactions

These are records of key usage where access was denied. By allowing the door controller to 'forget' these events, throughput can be considerably improved.

- No Access: Level
- No Access: Locked Out
- No Access: Time
- No Entry: Passback
- No Access: Holiday
- No Access: Visit Time
- Repeated Token Use
- PIN Reader Duress Alarm
- No Exit: Passback
- Incorrect PIN Entry

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